1758. a 8
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Nº 2465
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THE *Gentleman's Diary*,

OR THE

MATHEMATICAL REPOSITORY;

An ALMANACK

For the YEAR of our LORD, 1758.

BEING

the Second after BISSEXTILE, or LEAP-YEAR.

Containing many useful and entertaining Particulars, peculiarly adapted to the ingenious Gentlemen engaged in the delightful Study and Practice of the MATHEMATICKS.

The Eighteenth *Almanack* published of this Kind; and the Sixth of the NEW STYLE in *England*.

——— Quâ causâ argentea Phœbe
Passibus haud æquis graditur; cur subdita nulli
Hactenus Astronomo numerorum fræna recusat:
Cur remeant Nodi, curque Auges progrediuntur.
——— Quantis refluum vaga Cynthia pontum
Viribus impellit; dum fractis fluctibus ulvam
Deserit, ac Nautis suspectas nudat arenas,
Alternis vicibus suprema ad littora pulsans.

LONDON,

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Ephemerides. K.

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To the PUBLICK.

All Persons who are pleased to be *Contributors* to this DIARY, by answering the *Questions*, *Ænigmas*, &c. or by sending us new ones, or other Subjects proper for the Work; are desired to send them, and their Solutions along with them, before the first Day of *May* 1758, directed for the Author of the *Gentleman's* DIARY, to be left with *Tho. Peat*, School-master in *Castlegate*, *Nottingham*; and no where else (Post paid)

JANUARY hath xxxi Days.

M D	☉ Decl. South.
1	23° 1′
6	22 30
11	21 43
16	20 55
21	19 52
26	18 44

Laſt Quarter the 2d
New Moon the 9th
1ſt Quarter the 16th
Full Moon the 24th
} Day at {
39 m. paſt 4 Afternoon.
6 Afternoon.
half paſt 9 Morn.
half paſt 6 Morn.

1	A	Circ. New Y. D. 12. aft. Chriſtmas	11 A 17	5 M 0
2	M	Day 7 hours 53 minutes long,	Morn.	5 43
3	Tu	being now increaſed, and Nights	0 24	6 26
4	W	decreaſed, a quarter of an hour.	1 35	7 11
5	Th	Old Chriſtmas Day.	2 46	8 0
6	F	Epiph. CHRIST's * app. to Gentiles	3 59	8 51
7	S	Days are daily growing longer.	5 14	9 45
8	A	1 Sunday after Epiphany.	6 26	10 44
9	M	*Canterbury*. ☉ eclips'd, Inviſ.	☽ Sets	11 47
10	Tu	Princeſs ELIZ. born.	5 A 9	0 A 52
11	W	Days 8 hours 10 min. long.	6 28	1 52
12	Th	Old New Years Day.	7 50	2 50
13	F	Hilary, Biſh and Conf. *Preſton*, Lanc.	9 12	3 46
14	S	*We will not talk of bad Weather this Year.*	10 31	4 38
15		2 Sunday after Epiphany.	11 47	5 26
16	M	*Hickford*, Lanc.	Morn.	6 13
17	Tu	*Taviſtock*, Devonſhire.	1 0	6 58
18	W	Days increaſed above half an hour.	2 13	7 44
19	Th	(*Fair at* Notting. *the* 20)	3 21	8 30
20	F	In eight Days of St. Hil. 1. Ret.	4 25	9 19
21	S	Agnes, Rom. V. and Mart. *Briſtol.*	5 25	10 8
22	A	Septuageſima Sunday.	6 18	10 53
23	M	Days 6 hours 40 min. long.	7 6	11 46
24	Tu	*Derby*, ☾ eclipſed	☿ Riſes	Morn.
25	W	Converſion of St. PAUL.	5 A 44	0 34
26	Th	Days increaſed one hour.	6 47	1 19
27	F	From the Day of St. Hil. in 15 D.	7 51	2 5
28	S	Nights are ſhortening apace.	8 56	2 47
29	A	Sexageſima Sunday.	10 2	3 28
30	M	King CHAR. I. martyr'd, &c.	11 11	4 11
31	Tu		Morn.	4 55

D	☉ Riſes	☉ Sets	♄ Sets	♅ Riſes	♂ Riſes	♀ Sets	☿ Sets	Cl. bef. ☉
1	8 4	3 56	7 A 18	5 M 31	7 A 23	8 A 8	4 A 31	4 15
6	8 0	4 0	6 59	5 15	6 56	8 18	4 55	6 31
11	7 55	4 5	6 40	4 58	6 27	8 28	5 20	8 36
16	7 50	4 10	6 22	4 41	5 57	8 38	5 46	10 25
21	7 43	4 17	6 5	4 24	5 26	8 47	6 2	11 58
26	7 36	4 25	5 47	4 8	4 54	8 53	6 2	13 10

FEBRUARY hath XXVIII Days.

Last Quarter the 1st, 41 min. past 9 Morn.
New Moon the 8th, 41 min. past 4 Morn.
First Quarter the 14th, 3 quart. past 10 at Night.
Full Moon the 23d, 55 min. past 1 Morn.

M D	W D	Sundays, Holy and Remarkable Days, Length, Incr. Days, Terms, Fairs, &c.	☽ Rises	☽ Sets
1	W	*Bromley*, Eanc. *Reading*, Berks.	0 M 18	5 M
2	Th	Candlemas, or P. B. V. M,	1 28	6
3	F	On the Mor. of Purif. of bleſſ. *Mary*	2 41	7
4	S	*Graveſend*, Kent. *Plymouth*, Dev.	3 53	8
5	A	Quinq. or Shrove Sunday.	4 59	9
6	M	Days 9 hours 22 minutes long.	6 3	10
7	Tu	Shrove Tueſday ☉ Ec. Invis. 8.	6 54	11
8	W	Aſh Wedneſday, 1ſt Day of Lent.	☽ Sets	☽ A
9	Th	*Nantwich*, Cheſh. *Stamford*, Linc.	6 A 38	1
10	F	In eight Days of Purif. of bleſſ. *Mary*,	8 1	2
11	S	*Llandyſſel*, Monmouthſhire.	9 22	3
12	A	Quadrageſ. 1 Sun. in Lent.	10 40	4
13	M	Term Ends. Old Candlemas Day,	11 56	4
14	Tu	Valentine, Biſh. and M. *Flint*.	Morn.	5
15	W	Ember Week.	1 6	6
16	Th	Days are now increaſed, and Nights	2 14	7
17	F	ſhortened 2 hours 26 minutes.	3 16	8
18	S	Day 10 hours 12 minutes long.	4 12	8
19	A	Reminiſcere, 2 Sunday in Lent.	5 3	9
20	M	*Beverley*, Yorkſhire.	5 44	10
21	Tu	*Norton*, Oxf.	6 16	11
22	W	*Godalming*, Surrey.	6 45	Morn
23	Th	Day 10 hours 36 minutes long.	☽ Rises	0
24	F	St. MATTHIAS Ap. and M. *Bath*, Som.	6 A 48	0
25	S	*Feverſham*, Kent. *Caernarvon*. *Matlock*.	7 53	1
26	A	Oculi, 3 Sunday in Lent.	9 1	2
27	M	*Oundle*, Northampt.	10 10	2
28	Tu	*Cheſterfield*. Derbyſhire.	11 19	3

☽ D	☉ Rises	☉ Sets	♄ Sets	♃ Rises	♂ Rises	♀ Rises	☿ Sets	Cl
1	7 26	4 35	5 A 27	3 M 49	4 A 15	9 A 1	5 A 27	14
6	7 20	4 41	5 10	3 32	Sets	9 7	Rises	14
11	7 8	4 53	4 54	3 17	7 M 25	9 M 10	6 M 17	14
16	6 59	5 2	Riſes	3 0	7 1	9 11	5 58	14
21	6 49	5 12	6 M 43	2 44	6 38	9 10	5 47	14
26	6 39	5 22	6 25	2 28	6 14	9 8	5 42	13

MARCH hath xxxi Days.

M D	☉ Decl. South
1	7° 30′
6	5 3
11	3 37
16	1 39
21	0 N. 26
26	2 10

Quarter the 2d
New Moon the 9th
Quarter the 16th
Full Moon the 24th
Day at { 56 min. past 10 at Night. / 46 m. past 2 Afternoon. / half past 2 Afternoon. / 41 min. past 7 at Night.
☉ is 90 20 Days 3 Hours 33 Minutes, apparent Time.

W	David Arch. B. M. *Galgarth*, Breck.	R Morn.	4	M	2	
Th	Cedde, or Chad. B. L. *Stockport*, Chesh.	0	29	5	M	14
F	Days are now above 11 hours long.	1	40	6	T	7
S	*Melton-Mowbray*, Leic.	2	48	7	T	3
A	Lætare, 4 S. in Lent. Midlent Sunday.	3	51	8	S	4
M	*Epping*, Essex. *Rochford*, Essex.	4	46	9		5
Tu	Nottingham *Fair, for all sorts of Cattle.*	5	30	10		6
W	Days are now increased, and Nights	6	6	11	T	7
Th	shorten'd 3 hours 45 minutes.	☽ Sets		0	A	6
F	*We need not be much anxious as to the*	6	56	1	T	0
S	*Weather* (God *knows what is the best*)	8	19	1		54
A	Judica, 5 Sunday in Lent.	9	41	2		44
M	Days are increasing daily.	10	56	3		35
Tu	*Brimwelbanks*, Nort.	Morn.		4		22
W	*Oakham*, Rut. *Oswestry*, Shropshire.	0	7	5		13
Th	*Penzance*, Cornw.	1	13	6	W	1
F	*Hariff*, Hunt. *Malmsbury*, Wilts.	2	14	6		51
S	*Loughbro'*, Leic. *Worksop*, Nott.	3	5	7		41
A	Palm Sunday. 6 Sunday in Lent.	3	49	8		30
M	*Dolton*, Dev. *Durham*, *Ruthin*, Denb.	4	26	9		18
Tu	*Downes*, Devon.	4	55	10	M	3
W	Equal Day and Night.	5	21	10		49
Th	Nottingham, *for all sorts of Cattle.*	5	45	11		36
	Good Friday.	☽ Rises		Morn.		
	Annunc. Lady Day. Pr. Edward born	7 A	0	0		15
	Easter Day. Our Sav. Resur.	8	9	1		2
	Easter Monday. *Affreton*, D.	9	18	1		48
	Easter Tuesday.	10	29	2		36
	Preston, Lanc. *Stourbridge*, Worcest.	11	39	3		26
	Days 12 hours and 3 quarters long.	Morn.		4		
	Midhurst, Sussex. *Northmore*, *Derby*.	0	47	5		

☉ Rises	☉ Sets	♄ Rises	4 Rises	♂ Sets	♀ Sets	♃ Rises	Cl. bef. ☉
6 34	5 M 27	6 M 15	2 M 19	6 M 1	9 A 0	5 M 41	12 44
6 24	5 37	5 58	2 2	5 40	8 47	5 39	11 38
6 14	5 47	5 40	1 46	5 20	8 28	5 37	10 21
6 4	5 57	5 23	1 29	4 59	8 1	5 35	8 55
5 54	6 7	5 6	1 13	4 40	7 31	5 32	7 24
5 44	6 17	4 49	0 56	4 22	6 5	5 28	5 55

APRIL hath xxx Days.

Last Quarter the 1st	Day at	49 min. past 8 Morn.
New Moon the 8th		24 min. past Midnight.
First Quarter the 15th		10 min. past 8 Morning.
Full Moon the 23d		40 min. past 10 Morn.
Last Quarter the 30th		3 qu. past 3 Afternoon.

M D	☉ Decl. North.
1	4° 37
6	6 32
11	8 24
16	10 12
21	11 56
26	13 35

			☽	☽
1	S	All Fools Day. *Coventry*, Warwickshire.	1 M 52	6 M 0
2	A	**Low Sunday. 1 Sunday after Easter.**	2 48	6 58
3	M	*Northampton*, *Chesterfield*, Derb.	3 35	8 1
4	Tu	*Llanerkemith*, Angl. *Northfleet*, Kent.	4 12	9 0
5	W	Old Lady D. *Doncaster*. *Huntington*.	4 45	9 50
6	Th	*Epping*, Essex. *Rochford*, Essex.	5 13	10 53
7	F	*Asherton*, Warwickshire.	5 38	11 45
8	S	Days increased above 5 hours.	☽ Sets	0 A 33
9	A	**2 Sunday after Easter.**	8 A 39	1 24
10	M	Quind. Pasch. 1 Ret.	9 54	2 14
11	Tu	Days 13 hours 36 minutes long.	11 6	3 4
12	W	**Term begins.** *Haltwhistle*, North.	Morn.	3 55
13	Th	*Ashbourn*, Derb. *Budworth* Ches.	0 10	4 47
14	F	Days increased 6 hours 2 minutes.	1 8	5 37
15	S	*Bewley*, Hampshire. *Derby.*	1 55	6 29
16	A	**3 Sunday after Easter.**	2 35	7 17
17	M	Tres. Pasch. 2 Ret. *Malmsbury.*	3 7	8 1
18	Tu	*Cobham*, Surry, *Derby.*	3 34	8 49
19	W	*Cane Abbey*, Dors. *Elmore Green*, Dors.	3 57	9 39
20	Th	*Worcester*. *Cank*, Staff. *Norse*, Devonsh.	4 18	10 28
21	F	*Modbury*, Devonsh. *Rumney*, Kent.	4 38	11 15
22	S	*Shrewsbury*. *Gisborough*, Yorksh.	4 58	11 44
23	A	**4 Sunday after Easter. St. George.**	☽ Rises	Morn.
24	M	Mens. Pasch. 3 Ret.	8 A 27	0 27
25	Tu	**St. Mark Ev. & M.**	9 38	1 15
26	W	**Prince William born.**	10 49	2 6
27	Th	*Boroughbridge*, Yorksh.	11 55	3 1
28	F	*Soham*, Cambr. *Aberforth*, Yorksh.	Morn.	3 54
29	S	*Market Harbro'* Leic. *Newchurch*, Lanc.	0 52	5 0
30	A	**5 Sunday after Eas. Rogat. Sunday.**	1 42	5 51

M D	☉ Rises	☉ Sets	♄ Rises	♅ Rises	♂ Sets	♀ Sets	☿ Rises	C. bel.
1	5 33	6 28	4 M 29	0 M 35	4 M 1	6 A 9	5 M 22	3 59
6	5 23	6 38	4 11	0 16	3 43	Rises	5 17	2 30
11	5 13	6 48	3 53	11 A 54	3 26	4 M 3	5 11	1 3
16	5 4	6 57	3 37	11 30	3 11	3 5	Sets	0 Aft.
21	4 54	7 7	3 19	11 1	2 55	3 40	7 A 51	1 23
26	4 45	7 16	3 1	10 5	2 39	3 -	8 34	2 22

MAY hath xxxi Days.

			M D	☉ Decl North.
New Moon the 7th	Day at	10 in the Morning.	1	15° 00′
First Quarter the 15th		half past 2 Morning.	6	16 36
Full Moon the 22d		38 min. past 10 at Night.	11	17 56
Last Quarter the 29th		3 quarter past 8 at Night.	16	19 9
			21	20 14
			26	21 11

			☽ Sets		☽ Rises	
1	M	St. Ph. & Jac. Ap. & M. Q. Pasch. 4 Ret.	2 M	22	6 M	55
2	Tu	*Totnes*. *Lancaster*, *Arundel*, Sussex.	2	55	7	50
3	W	Rogation Week. Invent. of the Cross.	3	22	8	45
4	Th	Holy Thursday, CHRIST's Ascension	3	46	9	37
5	F	Craft. Ascen. 5 Ret. *Boston*, *Derby*,	4	10	10	28
6	S	*Abingdon*. Berks. *Kendall*, Westmor.	4	34	11	18
7	A	Exaudi. 6 Sunday after Easter.	☽ Sets		0 A	5
8	M	Term ends. *Phillips-Norton*, Som.	8 A	52	0	58
9	Tu	*Bosworth*, Leic. *Tockington* Glouceſt.	10	1	1	49
10	W	*Higham-Ferrers*, Northamp. *Lutterworth*	11	2	2	41
11	Th	*Leiceſter*. *Dunſtable*, Bedf. *Crediton*, Dev.	11	54	3	23
12	F	Old May Day. *Hertford*, *Tuxford*, War.	Morn.		4	23
13	S	*Tiddeſwel*, Derb. *Crouch*, Eſſ. *Bala*, Meri.	0	38	5	11
14	A	Whit. Sunday.	1	13	6	1
15	M	Whit. Monday. *Southwell*, Nott.	1	42	6	46
16	Tu	Whit. Tueſday *Newark*, Notting.	2	6	7	31
17	W	Ember Week. *Lenton*, Nott.	2	27	8	15
18	Th	*Lenton*, Nott. *Hateſbury*. Bucks.	2	45	8	57
19	F	*Derby*. *Hereford*. *Rocheſter*.	3	5	9	41
20	S	*Galgarth*. Breckn. *Wickham*, Hants.	3	24	10	26
21	A	Trinity Sunday.	3	46	11	12
22	M	Craft. Trin. 1 Ret.	☽ Riſes		Morn.	
23	Tu	*Sheffield*, Yorkſh. *Tho. Hare*.	8 A	38	0	3
24	W	Prince FREDERICK WILLIAM born.	9	48	0	56
25	Th	*Dagenham*, Eſſ. *Malmſbury*, W.	10	50	1	56
26	F	Term begins.	11	43	2	51
27	S	Venerable Bede, *Stortford*, Hertford.	Morn.		3	52
28	A	1 Sunday after Trinity.	0	22	4	51
29	M	K. CHAR. II. Nat. and Ret.	0	58	5	48
30	Tu	*Aldſtone*, Cum. *Odehill*, Ox. *Worksop*.	1	27	6	42
31	W	Days increaſed 8 hours and half.	1	51	7	33

D	☉ Riſes	☉ Sets	♄ Riſes	♅ Riſes	♂ Sets	♀ Riſes	☿ Sets	Cl. aft. ☉
1	4 36	7 25	2 M 43	10 A 36	2 M 24	3 M 19	9 A 14	3 8
6	4 28	7 33	2 25	10 14	2 8	3 9	9 42	3 45
11	4 20	7 41	2 7	9 52	1 52	2 59	9 58	3 58
16	4 12	7 48	1 48	9 29	1 37	2 49	10 0	4 2
21	4 5	7 55	1 29	9 7	1 21	2 38	9 49	3 51
26	4 0	8 0	1 9	8 44	1 5	2 29	9 25	3 27

JUNE hath xxx Days.

New Moon	the 5th	Day at	36 min. past 8 at Night.
First Quarter	the 13th		8 in the Afternoon.
Full Moon	the 21th		21 min. past 8 Morn.
Last Quarter	the 28th		20 min. past 1 Morn.

⊙ in ♋ 21 Day 3 Hours 33 Minutes apparent Time.

D			☽	D	⊙ Decl. North
1	Th	Days 16 hours and a quarter long.	2 M 16	8 M 2	
2	F	*Daventry. Northampton.*	2 37	9 1	
3	S	*Harsley-Green*, Lanc. *Kerby-Steph.*	3 0	10 0	
4	A	2 Sunday after Trinity.	3 27	10 51	
5	M	(Pr. of WALES bo. 4th Day 1738.)	☽ Sets	11 41	
6	Tu	*Folkingham*, Linc. *Lenham*, Kent.	8 A 47	0 A 32	
7	W	*Montgomery. Stow in Guillam*, Suff.	9 43	1 24	
8	Th	*St. Germains*, Cornwall.	10 30	2 16	
9	F	*Haddersfield*, Sussex.	11 9	3 7	
10	S	Prs. AMELIA born 1711.	11 40	3 53	
11	A	3 Sunday after Trinity.	Morn.	4 40	
12	M	(11 St. Barnabas Ap. & M.	0 7	5 25	
13	Tu	*Keddermister*, Wor. *Manhemot.*	0 29	6 9	
14	W	Term ends. *Bangor*, Cornwall.	0 49	6 52	
15	Th	*Ryston*, Somersetshire.	1 7	7 34	
16	F	Days 16 hours and above half long.	1 25	8 18	
17	S	*S. Alban*, M. K. of West. Sax.	1 45	9 3	
18	A	4 Sunday after Trinity.	2 7	9 54	
19	M	*Ingleton*, Yorksh.	2 35	10 46	
20	Tu	Transl. of Edw. K. of West. Sax.	3 9	11 43	
21	W	The longest Day in this Year.	☽ Rises	Morn.	
22	Th	K. GEORGE II. Inaug.	9 A 32	0 42	
23	F	*Armington*, Dev. *Folkingham*, Linc. Fast.	10 18	1 43	
24	S	Nativ. of St. JOHN Bap.	10 56	2 41	
25	A	5 Sunday after Trinity.	11 27	3 43	
26	M	K. GEORGE II. proclaimed.	11 53	4 39	
27	Tu	*Boston*, Linc. *Burton*, Staff.	Morn.	5 32	
28	W	*Folkstone*, *Stow Green*, Do. (Fast	0 17	6 20	
29	Th	St. Peter Ap. & M.	0 37	7 6	
30	F	*Bridgenorth*, Shropshire.	1 0	7 54	

M	D	⊙ Rises	⊙ Sets	☽ Rises	♃ Rises	♂ Sets	♀ Rises	♄ Sets	Clasts ⊙
25	3	3 53	8 7	0 M 45	8 A 16	0 M 45	2 M 17	8 A 42	2 43
26	3	3 50	8 10	0 24	Sets	0 29	2 6	Rises	1 54
27	3	3 46	8 14	0 4	3 M 38	0 12	1 56	3 M 54	0 57
26	3	3 44	8 16	11 A 39	3 15	11 A 51	1 47	3 30	ob. 4
27	3	3 43	8 17	11 19	2 52	11 36	1 38	3 7	3 18
26	3	3 44	8 16	10 58	2 30	11 20	1 30	2 49	2 21

JULY hath xxxi Days.

M. D.	☉ Decl. North.
1	23° 9
6	22 50
11	22 9
16	21 24
21	20 30
26	19 28

New Moon the 5th, 43 min. past 8 Morn.
First Quarter the 13th, 5 min. past Noon.
Full Moon the 20th, 34 min. past 4 Afternoon.
Last Quarter the 27th, 4 min. past 7 Morn.

			☽		☉	
1	S	*Worksop*, Nott. *Hith*, K. *Thornby Ab.* Ely.	1 M	25	8 M	44
2	A	6 Sunday after Trinity,	1	52	9	33
3	M	*Dereham*, Norf. *Shrewsbury*.	2	25	10	21
4	Tu	Transl. of S. Mart. B. & C.	3	4	11	14
5	W	☉ Eclipsed, Invis. *Leicester*.	☽ Sets		0 A	6
6	Th	*Lancaster*, *Liverpool*. *Wimborn*.	9 A	2	0	55
7	F	Tho. a Becket, *Chipping-Norton*,	9	37	1	44
8	S	*Folkestone*, Kent. *Machynleth*, Montg.	10	4	2	32
9	A	7 Sunday after Trinity.	10	28	3	17
10	M	*Mansfield*, Nott. *Bolton*, Lanc.	10	48	4	0
11	Tu	*Peterborough*, Northamptonshire.	11	6	4	44
12	W	*Canterbury*, Kent. *Carshalton*, Surry.	11	25	5	26
13	Th	*Congleton*, Chesh. *Huntingdon*.	11	44	6	7
14	F	Days grow shorter every Day.	Morn.		6	49
15	S	Swithun, B. of Wincheſt. Transl.	0	5	7	37
16	A	8 Sunday after Trinity.	0	29	8	27
17	M	*Belt*, Breckn. *Leek*, Staffordsh.	0	58	9	19
18	Tu	*Exeter*, Devonsh. *Huntindon*, Hant.	1	35	10	18
19	W	*Kenninghal*, Norfolk.	2	24	11 M	19
20	Th	☽ Eclipsed, Invis. Marg. V. & M.	☽ Rises		Morn.	
21	F	*Fotheringhay* (W. Smith) *Alfreton*, Derb	8 A	50	0	24
22	So	Prs. CAR. MAT. born. M. Magdalene.	9	25	1	27
23	A	9 Sunday after Trinity.	9	52	2	25
24	M	*Farringhay*, Kent. (Fast	10	18	3	22
25	Tu	St. JAMES Ap. & M. *Derby*.	10	40	4	13
26	W	S. Anne, Mother to the Bl. Virg. Mary.	11	3	5	2
27	Th	*Heedon*, Yorksh. *Milson*, Wilts.	11	27	5	50
28	F	*Emlin*, Worc. *Winchcomb*, Glou.	11	53	6	38
29	S	Days are now shortened above an hour.	Morn.		7	27
30	A	10 Sunday after Trinity.	0	25	8	17
31	M	*Alfreton*, Derb *Honiton*, Devon.	1	1	9	7

M	D	☉ Rises	☉ Sets	☽ Rises	♃ Sets	♂ Sets	♀ Rises	☿ Rises	☿ Incl.	☉ Decl.
1	3	46	8 14	10 A 37	2 M 7	11 A 3	1 M 23	2 M 55	3 15	
6	3	49	8 11	10 17	1 46	10 47	1 16	2 29	4 7	
11	3	53	8 7	9 56	1 23	10 30	1 10	2 30	4 58	
16	3	58	8 2	9 36	1 2	10 14	1 7	2 42	5 28	
21	4	4	7 56	9 15	0 41	9 59	1 5	3 6	5 49	
26	4	11	7 49	8 55	0 20	9 47	1 5	3 41	5 52	

AUGUST hath xxxi Days.

New Moon the 3d
First Quarter the 12th
Full Moon the 19th
Last Quarter the 25th
} Day at {
58 m. after 10 at Night.
24 min. past 2 Morn.
17 min. past Midnight.
32 min. past 3 Afternoon.

M D	☉ Decl. North.
1	18° 30′
6	16 43
11	15 20
16	13 45
21	12 7
26	10 25

1	Tu	Lamas Day. Dog Days begins.	1 M 46	9 M 59
2	W	*Wincheſter*, Hampſh. *Northwich*, Cheſh.	2 37	10 48
3	Th	*Carnarvon. Daventry*, *Redruth*.	☽ Sets	11 38
4	F	*Epſom*, Surry. *Ravenglaſs*, Cumb.	8 A 6	0 A 27
5	S	*Doncaſter*, York. *Stamford*, Linc.	8 31	1 13
6	A	11 Sunday after Trinity.	8 52	1 55
7	M	Name of Jeſus. *Boſton*, Linc.	9 12	2 39
8	Tu	*Finſut*, Cornw. *Ruthin*, Denb.	9 31	3 22
9	W	*Llanwrſt*, Denb. *Skirkin*, Middleſex.	9 49	4 2
10	Th	S. Laur. Arch. D. of R. & M.	10 9	4 44
11	F	Princeſs AUGUSTA born 1737.	10 31	5 30
12	S	Old Lamas. *Newcaſtle*. *Dunſtable*,	10 57	6 18
13	A	12 Sunday after Trinity,	11 30	7 8
14	M	*Stow*, Suffolk.	Morn.	8 3
15	Tu	*Bakewell*, Derb. *Northampton*.	0 12	9 2
16	W	*Aſhburn*, Derb. *Giſborough*, Yorkſh.	1 7	10 6
17	Th	*Bardney*, Hampſhire.	2 13	11 7
18	F	Days ſhortened above 2 hours.	3 30	Morn.
19	S	*Dartington*, Devonſhire.	☽ Riſes	0 8
20	A	13 Sunday after Trinity.	8 A 22	1 4
21	M	*Arundel*, Suſſex. *Crediton*, Devon.	8 46	2 1
22	Tu	*Bracknell*, Berk. *Penkridge*, Staff.	9 9	2 56
23	W	*Belford*, Northum. *Dinton*, Oxf. Faſt.	9 34	3 45
24	Th	St. BARTHOLOMEW, Ap. & M.	10 0	4 35
25	F	*Milverton*, and *Morelidge*, Somerſetſh.	10 30	5 29
26	S	*Carliſle*, Cumb. *Huntingdon*.	11 6	6 19
27	A	14 Sunday after Trinity.	11 48	7 8
28	M	S. Au. B. of Hip. C. D. *Ripley*, York.	Morn.	8 1
29	Tu	Beheading of John Bap.	0 37	8 50
30	W	*Barnham*, Suffolk, *for Sheep and Lambs*.	1 33	9 40
31	Th	Day 13 hours and above half long.	2 34	10 28

M D	☉ Riſes	☉ Sets	♄ Riſes	♃ Sets	♂ Sets	♀ Riſes	☿ Sets	Cl. bef. ☉
1	4 20	7 40	8 A 30	11 A 51	9 A 25	1 M 7	8 A 3	5 49
6	4 27	7 32	8 10	11 32	9 11	1 11	8 4	5 23
11	4 35	7 24	7 50	11 13	8 57	1 18	8 0	4 44
16	4 44	7 15	7 32	10 55	8 44	1 27	7 54	3 52
21	4 53	7 6	Sets	10 36	8 30	1 38	7 45	2 44
26	5 2	6 57	4 M 49	10 19	8 17	1 50	7 3	1 27

SEPTEMBER hath xxx Days.

New Moon the 2d	Day at	53 min. past 2 Aftern.
First Quarter the 10th		4 min. past 3 Aftern.
Full Moon the 21th		13 min. past 8 Morn.
Last Quarter the 27th		46 min. past 3 Morn.

☉ in ♎ 22 D. 16 h. 4 m. App. Time

M D	☉ Decl. North.	
1	7°	0′
6	6	25
11	4	32
16	2	36
21	0	40
26	1 S	18

1	F	Giles, Abbot & Conf. *North-moor*, Wilt	3 M	19	11 M 15
2	S	*Richmond-Rood*, North. Lond. Burnt.	☽ Sets		0 A 3
3	A	**15 Sunday after Trinity.**	7 A	24	0 43
4	M	*Bartholomew Fair*, London.	7	43	1 26
5	Tu	*Botley*, Hampsh. *Chipping Norton.*	8	2	2 10
6	W	*Folkingham*, Linc. *Snaith*, Yorksh.	8	21	2 48
7	Th	**Dog Days end.** Enurchus. B.	8	43	3 33
8	F	Nativ. of the B.V.M. *Wirksworth*, Derb.	9	6	4 17
9	S	*Bromsgrove*, Worc. *Devizes*, Wilts.	9	35	5 6
10	A	**16 Sunday after Trinity.**	10	13	5 56
11	M	*Tallowdown*, Dorsetshire.	11	0	6 53
12	Tu	*Brentford*, Mid. *Whitehaven*, Cum.	11	59	7 52
13	W	*Tiddeswell*, Derb. Will. Beech.	Morn.		8 52
14	Th	Holy Cross Day. *Woburn*, Bedf.	1	10	9 54
15	F	Days 12 hours and quarter long.	2	31	10 54
16	S	*Newcastle*, and *Walsall*, Staff.	2	55	11 52
17	A	**17 Sunday after Trinity.**	☽ Rises		Morn.
18	M	*Southwark*, *Shirbitch*, Camb.	7 A	17	0 48
19	Tu	*Carlisle*, Cum. *Northampton.*	7	42	1 42
20	W	Ember Week. *Devizes*, (Fast.	8	8	2 33
21	Th	**St. MATTHEW, Ap. & Ev.**	8	38	3 29
22	F	*Allchurch*, Worcest.	9	12	4 21
23	S	*Halkin*, Wilts. *Paincastle*, Radnor.	9	52	5 12
24	A	**18 Sunday after Trinity.**	10	41	6 2
25	M	*Chesterfield*, Derb. *Denbigh*,	11	35	6 53
26	Tu	S. Cyprian, Archb. of Carth. & Mar	Morn.		7 46
27	W	*Derby*, lasts three Days. *Jer. Roe.*	0	36	8 34
28	Th	*Glocester. Tuxford*, Nottinghamsh.	1	40	9 23
29	F	**St. MICHAEL and all Angels.**	2	45	10 7
30	S	S Jer. Pr. Conf & Doct. *Wrexham*, Denb.	3	49	10 50

M. D.	☉ Rises	☉ Sets	♄ Sets	♃ Sets	♂ Sets	♀ Rises	☿ Sets	Cl. aft. ☉
1	5 14	6 45	4 M 24	9 A 59	8 A 12	M 7	7 A 22	0′ 19
6	5 23	6 36	4 49	9 42	7 49	2 27	7 8	1 55
11	5 43	6 16	3 45	9 2	7 36	2 37	6 55	3 35
16	5 53	6 6	3 26	9 9	7 25	2 53	6 39	5 21
21	6 0	6 0	3 5	8 53	7 14	3 9	6 2	7 6
26	6 4	5 54	2 45	8 37	7 [illegible]	3 27	6 [illegible]	8 47

OCTOBER hath xxxi Days.

M D	☉ Decl. South
1	3° 15′
6	5 11
11	7 6
16	8 58
21	10 47
26	12 32

New Moon the 2d
First Quarter the 10th
Full Moon 16th
Last Quarter the 23d
} Day at { 42 min. past 7 Morn. / 2 in the Morning. / 8 min. past 5 at Night. / 22 min. past 8 at Night.

			☽ Sets	☽ Sets
1	A	19 Sunday after Trinity.	4 M 56	11 M 34
2	M	*Dover*, Kent. *Northallerton*, Yorksh.	☽ Sets	0 A 17
3	Tu	*Aberforth*, Yorksh. *Woodstock*, Ox.	6 A 36	0 59
4	W	*Peakridge*, Staffordshire.	6 57	1 41
5	Th	*Llanvilling*, Mont. *Lamport*, Som.	7 19	2 24
6	F	Faith, Virgin and Mart. *Hull*, Yorksh.	7 46	3 12
7	S	*Alfreton*, D. *for Horses, Foals, Cheese, &c.*	8 20	4 2
8	A	20 Sunday after Trinity.	9 2	4 55
9	M	S. Denys Areop. B. and M.	9 55	5 52
10	Tu	Old Mich. D. *Birmingham*, War.	11 0	6 50
11	W	*Lancaster*. *Leicester*. St. *Albans*,	Morn.	7 50
12	Th	*Banbury*, Oxf. *Salisbury*, Wilts.	0 14	8 47
13	F	Transl. of K. Ed. Conf. *Devizes*, Wilts.	1 36	9 46
14	S	*Buttonmoor*, Shrop. *Worksop*, Notting	3 0	10 42
15	A	21 Sunday after Trinity.	4 23	11 36
16	M	*Bosworth*, Leic. *Hay*, Brecknocksh.	☽ Rises	Morn.
17	Tu	Etheldred. Virg. *Sheffield*, Yorksh.	6 A 14	0 27
18	W	St. LUKE the Evang. *Radnor*.	6 41	1 19
19	Th	*Abberford*. *Yarm*, Yorksh. *Oxford*.	7 14	2 11
20	F	*Ashborn*, Derb. *Blythe*, Nott. *Hereford*.	7 52	3 8
21	S	(K. GEO. II. crowned 22, 1727.)	8 37	4 1
22	A	22 Sunday after Trinity.	9 31	4 53
23	M	*Aberfraw*, Angl. *Ripley*, Derb.	10 32	5 44
24	Tu	*Stockport*, Ch. *Windsor*, Berksh.	11 35	6 35
25	W	Crispin, Mart. *Charing*, Kent.	Morn.	7 23
26	Th	*Bromyard*, Heref. *Grantham*, Linc.	0 40	8 9
27	F	*Affington*, Devonshire, (Fast.	1 46	8 53
28	S	St. SIMON & JUDE, A. & M.	2 51	9 37
29	A	23 Sunday after Trinity.	3 55	10 19
30	M	*Banbury*, Oxf. *Ely*, Camb.	5 3	11 0
31	Tu	*Bridgenorth*, Shropshire. (Fast.	6 10	11 44

M D	☉ Rises	☉ Sets	♄ Sets	4 Sets	♂ Sets	♀ Rises	♀ Sets	Cl. aft. ☉
1	6h 13	5h 47	2 M 27	8 A 22	6 A 52	3 M 44	5 A 43	10 26
6	6 22	5 37	2 7	8 6	6 41	4 0	Rises	11 55
11	6 32	5 27	1 47	7 50	6 31	4 17	5 M 34	13 15
16	6 42	5 17	1 27	7 35	6 20	4 33	5 3	14 24
21	6 51	5 8	1 8	7 20	6 11	4 50	4 59	15 20
26	7 1	4 58	0 49	7 4	6 2	5 6	5 13	15 54

NOVEMBER hath xxx Days.

			D	☉ Decl. South
New Moon the 1st		27 min. before 1 Morn.	1	14° 31
First Quarter the 8th		18 min. past 11 Forenoon.	6	16 5
Full Moon the 15th	Day at	49 min. past 3 Morn.	11	17 35
Last Quarter the 22d		9 min. past 4 Afternoon.	16	18 50
New Moon the 30th		34 min. past 4 Aftern.	21	20 0
			26	20 50

			☽ Sets	☉ A	
1	W	All Saints Day. *Newark.*	5 A	53	1 11
2	Th	Princess Or. b. 1709. All Souls.	6	24	2 1
3	F	On the Morrow of all Souls.	7	4	2 58
4	S	*Appleshaw*, Hants.	7	54	3 41
5	A	19 Sunday after Trin. Powder Plot.	8	53	4 46
6	M	Term begins. Leonard, Conf.	10	2	5 45
7	Tu	Prince HENRY FRED. born 1745.	11	19	6 42
8	W	*Colchester*, Essex. *Hertford.*	Morn.		7 33
9	Th	*Darlington*, Durh. *Stamford*, Linc.	0	39	8 20
10	F	K. GEO. II. bo. 1683. *Rochester.*	2	0	9 24
11	S	S. Martin, Bish. & Conf. *Lenton*, 2 Ret.	3	23	10 17
12	A	25 Sunday after Trinity.	4	46	11 8
13	M	Britius, Bishop. *Huntingdon*, Her.	6	8	11 57
14	Tu	*Brecknock, and five Days following.*	☽ Rises		Morn.
15	W	Machutus, Bish. *Andover.*	5 A	44	0 52
16	Th	*Andover*, Hampsh. *Gisborough*, Yor.	6	25	1 45
17	F	Hugh, Bish. of Linc.	7	15	2 41
18	S	In eight Days of Saint Martin.	8	14	3 36
19	A	26 Sunday after Trinity.	9	18	4 32
20	M	Edmund, King & M. *Lyng*, Norf.	10	22	5 17
21	Tu	*Garstang*, Lanc. *Lamport*, Som.	11	28	6 3
22	W	Cecilia, Virg. & Mart. *Dover.*	Morn.		6 46
23	Th	S. Clem. 1. B. of R. & M.	0	33	7 32
24	F	*Ashamstead*, Berk. *Hide*, Essex.	1	39	8 12
25	S	Prince WILL. HENRY bo. 1743.	2	46	8 54
26	A	27 Sunday after Trinity.	3	52	9 35
27	M	Term ends the 28.	4	58	10 16
28	Tu	*Sheffield*, Yorkshire. Tho. Hare.	6	8	11 4
29	W	(St. Andrew, Ap. & M. the 30th.	☽ Sets		11 53
30	Th	Her Royal High. the Prs. of W. b. 1719.			

M D	☉ Rises	☉ Sets	☽ Sets	4 Sets	♂ Sets.	♀ Rises	♀ Rises	Cl. aft. ☉
1	7h 12	4h 42	0 M 25	6 A 46	5 A 51	5 M 26	5 M 43	16 14
6	7 21	4 38	0 6	6 30	5 42	5 42	6 9	16 8
11	7 29	4 30	11 A 42	6 14	5 34	5 58	6 37	15 43
16	7 37	4 22	11 23	5 57	5 26	6 13	7 4	14 54
21	7 45	4 15	11 2	5 40	5 19	6 28	Sets	13 45
26	7 51	4 9	10 42	5 22	5 13	6 43	4 A 4	12 18

DECEMBER hath xxxi Days.

M D	☉ Decl. South.
1	21° 53′
6	22 35
11	23 4
16	23 22
21	23 29
26	23 24

First Quarter the 7th
Full Moon the 14th
Last Quarter the 22d
New Moon the 30th
} Day at { 18 min. past 7 at Night. 46 min. past 4 Aftern. 36 min. past 1 Morn. 9 min. past 7 Morn.

☉ in ♑ 21 D. 7 h. 38 m. App. Time.

1	F	*Dulton*, Dev *Heath*. Su. *Rotherham*, Yor.	4 A	55	0 A 45
2	S	*Hoxne*, Suffolk.	5	40	1 39
3	A	Advent Sunday	6	38	2 36
4	M	*Atherſtone*, Warw. *Thuſk*, York.	7	45	3 35
5	Tu	*Colford*, Glouc.	9	0	4 33
6	W	Nichol. Biſh. of Myra in Lycia	10	19	5 29
7	Th	Days decreaſed above 8 hours and half.	11	38	6 26
8	F	Concept. of the B. V. M. *Boſton*, Linc.	Morn.		7 12
9	S	*Bradford*, Wilts.	0	58	8 6
10	A	2 Sunday in Advent.	2	17	8 50
11	M	*Preſton*, Lanc. *Rocheſter*, Kent.	3	37	9 40
12	Tu	*Bedal*. Yorkſh. *Shrewſbury*.	4	55	10 32
13	W	Lucy, Virgin & Mart.	6	14	11 25
14	Th	Days will ſoon be at the ſhorteſt,	☽ Riſes		Morn.
15	F	*Atherſtone*, Warw. *Namptwich*, Cheſh.	4 A	52	0 18
16	S	O Sapientia. *Pocklington*, Yorkſh.	5	46	1 11
17	A	3 Sunday in Advent.	6	49	2 4
18	M	*Spalding*, Linc.	7	54	2 55
19	Tu	*Bedford*, *Northampton*.	9	0	3 44
20	W	Ember Week. (Faſt	10	6	4 32
21	Th	St. THOMAS Ap. & M.	11	12	5 13
22	F	*Newport Keams*, Montg.	Morn.		5 56
23	S	The Days will lengthen daily.	0	17	6 37
24	A	4 Sunday in Advent.	1	21	7 19
25	M	CHRISTMAS-DAY.	2	30	8 3
26	Tu	St. STEPHEN, 1ſt Martyr.	3	38	8 43
27	W	St. JOHN Ap. and Evang.	4	47	9 30
28	Th	Innocents Day.	5	57	10 20
29	F	*Cotkhill*, Som.	7	8	11 14
30	S	☉ eclipſed, inviſible.	☽ Sets		0 A 14
31	A	1 Sunday after Chriſtmas.	5 A	16	1 12

M D	☉ Riſes	☉ Sets	♄ Sets	♃ Sets	♂ Sets	♀ Riſes	☿ Sets	Cl. aft. ☉
1	7h 57	4h 3	10 A 23	5 A 5	5 A 7	6 M 58	4 A 4	10′ 32″
6	8 1	4 0	10 3	4 49	5 1	7 11	4 8	8 28
11	8 5	3 55	9 44	4 32	4 56	7 24	4 15	6 15
16	8 7	3 53	9 23	4 15	4 53	7 36	4 28	3 50
21	8 8	3 52	9 3	Riſes	4 51	7 45	4 48	1 20
26	8 7	3 53	8 42	7 M 56	4 48	7 52	5 4	1 bef. 11

A TABLE of all the KINGS and QUEENS of *England*, since the Conquest.

The Year of the Birth of each King and Queen; also the Year, Month, and Day, whereon they began to reign: beginning the Year the first Day of January, 1758.			The Length of each Reign.			The Years expired since each Reign began and ended.	
Names.	Born.	Began to Reign.	Y.	M.	D.	Beg	End
William Conq.	1027	1066 October 14	20	10	26	692	671
William Rufus	1057	1087 Septem. 9	12	10	24	671	658
Henry I.	1058	1100 Auguſt 2	35	4	0	658	623
Stephen	1105	1135 Decem. 1	18	10	24	623	604
Henry II.	1134	1154 October 25	34	8	11	604	569
Richard I.	1156	1189 July 6	9	9	0	569	559
John	1166	1199 April 6	17	6	13	559	542
Henry III.	1207	1216 October 19	56	1	0	542	486
Edward I.	1239	1272 Novem. 16	34	7	21	486	451
Edward II.	1284	1307 July 7	19	6	13	451	431
Edward III.	1312	1327 January 20	50	5	1	431	381
Richard II.	1366	1377 June 21	22	3	8	381	359
Henry IV.	1367	1399 Septem. 29	13	5	21	359	345
Henry V.	1389	1413 March 20	9	5	11	345	336
Henry VI.	1421	1422 Auguſt 31	38	6	4	336	297
Edward IV.	1442	1461 March 4	22	1	5	297	275
Edward V.	1471	1483 April 9	0	2	13	275	275
Richard III.	1443	1483 June 22	2	2	0	275	273
Henry VII.	1457	1485 Auguſt 22	23	8	0	273	249
Henry VIII.	1492	1509 April 22	37	9	6	249	211
Edward VI.	1537	1547 January 28	6	5	8	211	205
Mary I.	1516	1553 July 6	5	4	11	205	200
Elizabeth	1533	1558 Novem. 17	44	4	7	200	155
James I.	1566	1603 March 24	22	0	3	155	133
Charles I.	1600	1625 March 27	23	10	3	133	109
Charles II.	1630	1649 January 30	36	0	7	109	73
James II.	1633	1685 February 6	4	0	7	73	69
William III.	1662	1689 Feb. 13	5	10	15	69	56
Mary II.	1650		13	0	23	69	64
Anne	1665	1702 March 8	12	4	24	56	44
George I.	1660	1714 Auguſt 1	12	10	10	44	31
George II.	1683	1727 June 11	whom God preſerve.				

A Compendious TABLE of INTEREST,

Shewing the Interest of any Sum of Money, from a Million to a Pound; for any Number of Days, at any Rate of Interest.

N°	l.	s.	d.	q.	N°	l.	s.	d.	q.
1000000	2739	14	6	0 ,99	1000	2	14	9	2 ,14
900000	2465	15	0	3 ,29	900	2	9	3	3 ,12
800000	2191	15	7	1 ,59	800	2	3	10	0 ,11
700000	1917	16	1	3 ,89	700	1	18	4	1 ,10
600000	1643	16	8	2 ,19	600	1	12	10	2 ,80
500000	1369	17	3	0 ,49	500	1	7	5	3 ,70
400000	1095	17	9	2 ,79	400	1	1	11	0 ,50
300000	821	18	4	1 ,09	300	0	16	5	1 ,40
200000	547	18	10	3 ,40	200	0	10	11	2 ,30
100000	273	19	5	1 ,70	100	0	5	5	3 ,01
90000	246	11	6	0 ,32	90	0	4	11	0 ,71
80000	219	3	6	0 ,96	80	0	4	4	2 ,41
70000	191	15	7	1 ,59	70	0	3	10	0 ,11
60000	164	7	8	0 ,22	60	0	3	3	1 ,81
50000	136	19	8	2 ,85	50	0	2	8	3 ,51
40000	109	11	9	1 ,48	40	0	2	2	1 ,21
30000	84	3	10	0 ,11	30	0	1	7	0 ,90
20000	54	15	10	2 ,74	20	0	1	1	0 ,60
10000	27	7	11	1 ,37	10	0	0	6	2 ,30
9000	24	13	1	3 ,23	9	0	0	5	3 ,07
8000	21	18	4	1 ,10	8	0	0	5	1 ,40
7000	19	3	6	2 ,96	7	0	0	4	2 ,41
6000	16	8	9	0 ,82	6	0	0	3	3 ,76
5000	13	13	11	2 ,58	5	0	0	3	1 ,15
4000	10	19	2	0 ,55	4	0	0	2	2 ,52
3000	8	4	4	2 ,41	3	0	0	1	3 ,86
2000	5	9	7	0 ,27	2	0	0	1	1 ,26
1000	2	14	9	2 ,14	1	0	0	0	2 ,63

RULE.

Multiply the Sum by the Number of Days; and that Product by the Rate per Cent. Then cut off the two last Figures to the Right Hand, and the rest you must find in the Table.

Example, What is the Interest of 100 l. for 365 Days at 5 per Cent.

N°. of Days	365		Then in the Table						
multiply by	100		against	1000	is	2	14	9	2 ,14
Product	36500			800		2	3	10	0 ,11
multiply by	5	Rate p. Cent.		20		0	1	1	0 ,60
	182500			5		0	0	3	1 ,15
			Answ.	5		0	0	0	0 ,00

The Eclipses, 1758.

By Mr. *John Thorpe*, Schoolmaster at *Woodborough*, from *Manuscripts* and also from Mr. *Street's* Tables.

Of six Eclipses that will happen this Year, only one will be visible in *England*. They happen as follows, *viz.*

The *first* is a small Eclipse of the *Sun*, on the 9th of *January*, about a quarter past 6 at Night. *Invisible.*

The *second*, is of the *Moon*, on *January* the 24th in the Morning, total and (part) visible; the Calculation of which for London, take as follows.

	Manuscript Tab				*Street's* Tables.			
	d.	h.	′	″	d.	h.	′	″
Equal Time of the Orbit ☿, *January*	23.	18.	40.	46.	23.	18.	30.	16.
Equation of Time add			12.	45.			12.	45.
Apparent Time of the Orbit ☿	23.	18.	53.	31.	23.	18.	43.	01.
	S.	o.	′	″	S.	o.	′	″
Mean Anomaly of ☉	6.	24.	46.	10.	6.	25.	23.	57.
Mean Anomaly of ☽	11.	18.	50.	5.	11.	14.	0.	23.
True Place of ☉	10.	4.	20.	15.	10.	4.	17.	38.
True Place of ☽ in her Orbit.	4.	4.	20.	15.	4.	4.	17.	38.
North Node substract	4.	4.	11.	40.	4.	4.	8.	47.
Argument of Latitude			8.	35.			8.	51.
Reduction substract				2.				2.
Hourly Motion of ☽ from ☉			26.	40.			27.	8.
Whence the Time of Red. *add* & *sub.*	d.	h.		5.	d.	h.		4.
Apparent Time of the Ecliptic ☿	23.	18.	53.	36.	23.	18.	43.	5.
Apparent Time of the Middle ☿	23.	18.	53.	26.	23.	18.	42.	56.
Horizontal Parallax of the ☽			54.	12.			53.	6.
Horizontal Parallax of the ☉ add				10.				15.
Their Sum			54.	22.			53.	21.
Semidiameter of ☉ sub.			16.	22.			16.	11.
Rem. the Semidiam. of ⊖ Shadow			38.	00.			37.	10.
Semidiameter of ☽ add			14.	51.			14.	22.
Sum of Semid. of ☽ and Shadow			52.	51.			51.	32.
Lat. of ☽ North ascending, sub.				45.				46.
Rem. the Part deficient			52.	6.			50.	46.
As Semid. of ☽ : 6 Digits : : Part def. : to Digits Ec.			21.	3.			21.	12

For the Scruples of Incidence, &c. I shall only instance in one of them, which shall be *Street's*, the other being obtained after the same Manner, thus,

Sum of the Semidiam. of ☽ and ⊖ in Seconds 3192″.

The ☽ Latitude add & sub. 46.

add { 3.510277 / 3.497759 } Log. of the { Sum 3238 / Difference 3146 }

Sum 7.008036

Half 3.504018 Log. of the Scruples of Incidence 3192.

For the Time of Incidence, thus

As hourly Motion of ☽ from ☉ : 6 : : 1 Scruples of Incidence : Time. } h. ′ ″ | h. ′ ″
1. 58. 52 | 1. 57. 38.

The Time of Incidence being sub. and added from and to the Middle, gives the Time of Beginning and End of the general Eclipse.

The Scruples and Time of ½ total Darkness may be obtained after the same Manner, only instead of the Sum of the Semidiameter of ☽ and ☉ Shadow, take their *Diff.* and the Time of ½ total Darkness will be found 52′ 3″—50′ 23″.

From the foregoing Calculation may be deduced

The apparent Time of the beginning at *London*, 1758, *January* 24 Morn.	h. ′ ″	h. ′ ″
Beginning of total Darkness	4. 54. 34.	4. 45. 19.
Greatest Obscuration	6. 1. 23.	5. 52. 34.
Ecliptic ☌	6. 53. 26.	6. 42. 57.
End of total Darkness	6. 53. 36.	6. 43. 8.
End of the Eclipse	7. 45. 29.	7. 33. 20.
Whole Duration	8. 52. 18.	8. 40. 35.
Digits eclipsed	3. 57. 44.	3. 55. 16.
	21°. 3.	21°. 12.

Note, The *Moon* sets that Morning about 37 min. past 7; which will be about the Time it begins to emerge out of total Darkness.

In this *Type*, The large dark Circle represents a Section of the Earth's Shadow. AB, a Portion of the Ecliptic; CD, is the *Moon's* Way; *a* the Centre of the *Moon* at the Beginning, *b*, at the End, &c.

The third *Eclipse* is of the *Sun*, on the 8th of *February*, at 3 quarters past Four in the Morning.

The fourth is also a *solar* Eclipse, on *July* 5, about 45 min. past 8 in the Morning; nearly 4 Hours after Sun-rising; yet the Moon having great South Latitude, which being increased by her Parallax, will depress her below the Sun's Limb, and thereby render the Eclipse invisible to us in *England*; but may be seen in the more southern Parts of the Earth, where the Parallax is small, about the *Levant*, and near the *Tropic*.

The 5th is a *Lunar* Eclipse on *July* 20th, 3 Quarters past 4, in the Afternoon, invisible.

The 6th and last is of the *Sun*, on the 30th of *December*, at half an Hour past 7, in the Morning, invisible.

Carlisle

Careless Jack of *Cambridge*, has also favoured us with the Calculation of the same Eclipse, from Mr. *Flamstead's* and Mr. *Dunthorn's* Tables.

	Flamstead.	*Dunthorn.*
The equal Time of the true ☌ of Sun and Moon, is *January*	D. h. ′ ″ 23. 18. 51. 26.	D. h. ′ ″ 23. 18. 33. 46.
At which Time	☉. °	☉. °
The Sun's true Place	10. 4. 21. 44.	10. 4. 19. 57.
Annual Argument	5. 15. 30. 35.	
Moon's true Place in her Orbit	4. 4. 21. 44.	4. 4. 19. 59.
Her true hourly Motion	30. 20.	29. 48.
Sun's true hourly Motion	2. 23.	2. 23.
Hourly Motion of Moon from Sun	27. 47.	27. 25.
Argument of Latitude	6. 2.	8. 17.
Abſolute Equation of Days, ſub.	4. 57.	4. 51.
Apparent Time of Oppoſition in Orbit	23. 18. 46. 29.	
Time of Reduction, ſub.	3.	2.
The apparent Time of ☌ in Ecliptic	23. 18. 46. 26.	4. 4. 19. 57.
Moon's horizontal Parallax	55. 2.	54. 2.
Sun's Ditto	10.	10.
Sum of the horizontal Parallaxes	55. 12.	54. 12.
Semidiameter of Sun	16. 21.	16. 23.
Semidiameter of Earth's Shadow	38. 51.	37. 49.
Increaſed		38. 39.
Moon's Semidiameter	14. 56.	14. 48.
Semidiameter of ☽ and Shadow	53. 47.	53. 27.
Moon's Latitude North	34.	46.
The ∠ of the Way of the ☽ and ☉ with a Circle of Lat.		84. 14.
Neareſt approach of the Centers of ☽ and Shadow		44.
Parts deficient	53. 13.	52. 43.
Digits eclipſed	21. 22. 54.	21. 22. 18.
The Time between the *true* & *mean* Ecl.		6.
Equal Time of the greateſt Obſcuration		23. 18. 33. 40.
Ap. T. of the greateſt Obſcuration	23. 18. 46. 32.	23. 18. 38. 32.
Motion of Semiduration	53. 35.	53. 26.
Time of Semiduration	1. 55. 28.	1. 57. 37.
Mot. of Semiduration in tot. Darkneſs	23. 53.	23. 50.
T. of Semiduration in tot. Darkneſs	51. 25.	52. 26.
The Beginning of the Eclipſe Morning	D. h. ′ ″ 24. 4. 51. 3.	D. h. ′ ″ 24. 4. 40. 54.
The Beginning of total Darkneſs	24. 5. 54. 51.	24. 5. 46. 51.
Middle of the eclipſe	24. 6. 46. 26.	24. 6. 38. 31.
End of total Darkneſs	24. 7. 38. 1.	24. 7. 30. 57.
End of the Eclipſe	24. 8. 41. 49.	24. 8. 36. 8.
Duration in total Darkneſs	1. 43. 10.	1. 44. 50.
Total Duration	3. 50. 46.	3. 55. 14.

We received the following from Mr. *Thos. Allen* of *Spalding*, By examining the ecliptic Boundaries, &c. I find only one viſible Eclipſe in the Year 1758, and that a Lunar one; the Time, &c. whereof I have carefully computed by Dr. *Halley's* Tables, for the Meridian of the royal Obſervatory at *Greenwich*, as follows.

In the Morning at the ROYAL OBSERVATORY at *Greenwich*. Apparent Time.

	D.	h.	′	″
Beginning of the Eclipse	24.	4.	30.	9.
Beginning of total Darkneſs		5.	35.	26.
Middle		6.	26.	48.
Ecliptic Oppoſition		6.	26.	58.
End of total Darkneſs		7.	18.	10.
End of the Eclipſe		8.	23.	27
Duration of total Darkneſs			1. 42.	44.
Duration of the Eclipſe			3. 53.	18.
Digits eclipſed		21°.	7.	

N. B. Mr. *Waddington* obſerves that this Eclipſe will be viſible to $\frac{3}{4}$ of the Earth's Surface.

Mr. *Sam. Towndrow* of *Cheſterfield*, in *Derbyſhire*, ſent us the following Calculation from *Leadbetter's* Tables; for *Jan.* 24.

	beg.	mid.	end.	beg. tot. Dark	end tot Dark
London	16h 31′ 50″	18h 31′ 4″	20h 30′ 18″	17h 23′ 13′	19h 38′ 55′
New York	11 43 50	13 43 4	15 42 18	12 35 13	14 00 55
Gibraltar	16 6 50	18 6 4	20 5 18	16 58 13	19 14 55
Cheſterfield	16 22 50	18 22 4	20 21 18	17 14 13	19 25 55
Liſbon	15 54 50	17 54 4	19 53 18	16 46 13	19 1 55
Barbadoes	12 38 50	14 38 4	16 38 4	13 30 13	13 45 55

Durat. 3 58 28 Duration of total Dark. 2 15 42 Digits Ecl. 21025 3.

A Catalogue of all the Ænigmas hitherto publiſhed in the GENT's DIARY.

1741.
1. HEMP, Richard Archibald.
2. The Year FORTY, William D.
3. TOBACCO-PIPE, Rich. Peat.
4. SEWING-NEEDLE, G——

1742.
(1) 5. A SHADOW, R. Ceſtrienſis.
(2) 6. An OYSTER, W. Durant.
(3) 7. ENDYMION, Abr. Lord.
(4) 8. INNOCENCE, R. Ceſtrienſis.
(5) 9. A SPIDER, Will. Chapple.
(6) 10. A PAIR OF SHOES, Ceſtrien.
(7) 11. SEWING-NEEDLE, J. Dew[hurſt.

1743.
(1) 12. A WINDMILL, G. Redford
(2) 13. BUCKLES, Pſeudo-Strephon
(3) 14. FLATTERY, Mad Tom.
(4) 15. The TIDES, W. Aldridge.
(5) 16. A SPIDER, Sam. Bamfield.
(6) 17. A FABLE, Abraham Lord,
(7) 18. LOVE, William Wiraketh.

1744. SEWING-NEEDLE, French.
(1) 19. SILENCE, Will. Chapple,

1745.
(1) 20. A SPADE, Will. Chapple.
(2) 21. SEWING-NEEDLE, R. Hulſe
(3) 22. A DREAM, John Randles,
(4) 23. An ÆNIGMA, W. Wallhead.
(5) 24. Letter A, Sam. Bamfield.
(6) 25. A TOPP, James Hall.
(7) 26. A CHIMNEY, Rebecca May
(8) 27. A PLOUGH, W. Holliday.

1746.
(1) 28. A FRANK'D LETTER, W. C
(2) 29. A PEN, Rich. Whitehouſe
(3) 30. A DREAM, Sam. Bamfield
(4) 31. LOVE, Samuel Hammond.
(5) 32, ACE OF TRUMPS, J. Hall.
(6) 33. A WOMAN'S BUSK, R. Hulſe
(7) 34. A MAN'S BEARD, W. Mobbs
(8) 35. A FISH-HOOK, R. Matlock
(9) 36. SHOEMAKER'S LAST, [J. Calvert.

1747.
(1) 37. The GOUT, Ralph Hulſe.
(2) 38. FLAX, Mama's Joye.
(3) 39. A GIMLET, James Hall.
(4) 40. A GUINEA, S. Hammond.
(5) 41. A CLOUD, Sam. Bamfield.
(6) 42. HEALTH, Anthony Moor.
(7) 43. GRINDINGSTONE, C. M.
(8) 44. DREDGING-BOX, W. Heaford

1748.
(1) 45. LIGHT, Sam. Bamfield.
(2) 46. YAWNING, Chagford Hill
(3) 47. Nar-

(3) 47. NONSENSE, Anth. Moor.
(4) 48. GENT. DIARY, W. Heaford.
(5) 49. NOTHING, Ralph Hulse.
(6) 50. POVERTY, James Mayo.
(7) 51. GUNPOWDER, Ed. Lashmere.

1749.
(1) 52. SILENCE, S. Hammond.
(2) 53. An EYE, Sam. Bamfield.
(3) 54. A NETTLE, James Hall.
(4) 55. A DICTIONARY, W. Chapple.
(5) 56. A KISS, William Dyke.
(6) 57. A MARRIED WOMAN, T. H.
(7) 58. RIVER TRENT, S. H.
(8) 59. A PEN, William Jepson.
(9) 60. WEAVER'S SHUTTLE, T. A.
(10) 61. A SPIDER, A. Buttonhole,

1750.
(1) 62. BELLOWS, S. Hammond.
(2) 63. DARKNESS, Sam. Squib.
(3) 64. WEATHERCOCK, F. T. M.
(4) 65. MODESTY, Salarea.
(5) 66. CONTENT, Ralph Hulse.
(6) 67. HOPE, Samuel Hammond.
(7) 68. An ARSE, Ned Fawsit.

1751.
(1) 69. NOISE, Thomas Peat.
(2) 70. The BRAIN, Mrs. P—n.
(3) 71. A CUSHION, Sam. Squib.
(4) 72. A SIEVE, S. Hammond.
(5) 73. PAPER, Philænigmata.
(6) 74. A CHAIR, S. Hammond.
(7) 75. A TOBACCO-PIPE, S. Squib.
(8) 76. A SUN-DIAL, W. Whalhead.

1752.
(1) 77. NOSE, John Pickburn.
(2) 78. FEAR, Samuel Hammond.
(3) 79. HAT, Richard Peat.
(4) 80. HEART, Philænigmata.
(5) 81. NEEDLE, J. Woolley.
(6) 82. CORKSCREW, W. Heaford.

1753.
(1) 83. HAPPINESS, Somebody.
(2) 84. A LOUSE, Sap-Scull.
(3) 85. LOVE, Tom. Faggott.
(4) 86. A BLANK, S. Hammond.
(5) 87. TEA, John Noorthouck.
(6) 88. LETHE, Robert Matlock.

1754.
(1) 89. A LIE, S. Hammond.
(2) 90. A KISS, John Dyke.
(3) 91. Letter O, W. Heaford.
(4) 92. SNUFFERS, D. Davis.
(5) 93. SIN, Andrew Wheldon.
(6) 94. A STANDISH, J. Noorthouck.
(7) 95. Tittle-top I, D. Davis.
(8) 96. The GOUT, R. Matlock.

1755.
(1) 97. CRICKET-BALL, C. Mason.
(2) 98. A SHADOW, Jos. Hartley.
(3) 99. TO-MORROW, Ant. Moor.
(4) 100. The TONGUE, J. N.
(5) 101. HOPE, Sam. Hammond.
(6) 102. Letter A, W. Davis.
(7) 103. THOUGHT, W. Davis.
(8) 104. An HOUR-GLASS, C. M.
(9) 105. A PERRIWIG, S. Bamfield.
(10) 106. A THIMBLE, S. Hodgkin.

1756.
(1) 107. Letter G, Tho. Pooke.
(2) 108. MAGGOT in a NUT, C. M.
(3) 109. A FIRESCREEN, Random J.
(4) 110. REASON, Tim. Drury.
(5) 111. ENVY, Sam. Hammond.
(6) 112. A PLAYER, Jac. Whitley.
(7) 113. A LOUSE, Cha. Wildbore.
(8) 114. SOPHISTRY, Isa. Tarratt.

1757.
(1) 115. A THUMB, Random, Jun.
(2) 116. A BEARD, Tim. Drury.
(3) 117. No. THREE, J. Noorthouck.
(4) 118. A TEAR, Ch. Underwood.
(5) 119. The Word NO, J. Haycroft.
(6) 120. ALE, Random, Junior.
(7) 121. BACK-GAMMON-TAB. C. W.
(8) 122. LIFE, a mongrel Cur.
(9) 123. A WALLNUT, J. Hall.
(10) 124. IGNORANCE, J. Pickburn.

ANSWERS to the QUESTIONS in the last Year's DIARY.

1. Question (161) answered by Mr. *Will. Kingston* of *Bath*.

Let $2s^2 \square x+z$; $2d$ $x-z$ $\therefore x=s^2+d^2$; and $z=s^2-d^2$;
$x^2=s^4+2s^2d^2+d^4$; $z^2=s^4-2s^2d^2+d^4$; $x^2-z^2=4s^2d^2$;

$2x^2 - 2z^2 = 8$ $s^2 d^2$. Then by the Problem we have $2x^2 - 2z^2 \times \sqrt{x - z^2} \times x + z = 128\sqrt{8}\, s^6 d^6 + 8 s^6 \pm a = 28292323,6$ &c. And $\frac{b^3 + z^3}{x + z} \cdot \sqrt{\frac{x - z}{2}}^{\frac{1}{2}} \cdot \sqrt{\frac{x - z}{2}}^{\frac{1}{2}} \cdot \frac{1}{d} = b = 28,637$.

Whence $d^2 = \frac{b^3}{3} = 4,5$ and $s^2 = \frac{a}{128\sqrt{8}\, d^6 + 8} = 9$.

Hence $s^2 + d^2 = x = w = 14$ the Letter O; $s^2 - d^2 = z = 5$ the Letter E.

Again $\frac{z-1}{2}^y - \frac{z-1}{2}^{y-1} + \frac{z-1}{2}^{y-5} + \frac{z-1}{2}^{y-9} = 2184 = c$; then by Logarithms we have $y - 10 \times L\frac{z-1}{2} = Lc - L\left(\frac{z-1}{2}^{10} - \frac{z-1}{2}^{9} + \frac{z-1}{2}^{5} + \frac{z-1}{2}\right) \therefore y = 10$

$= Lc - L\left(\frac{z-1}{2}^{10} - \frac{z-1}{2}^{9} + \frac{z-1}{2}^{5} + \frac{z-1}{2}\right) = z \therefore y = z + 10 = 12$. the Letter M.

Now $\frac{w^6 u^4 - x^3 u^2 v^2 - z^3 x v^2 u^2 + y^4 x^2 u^2 v^2}{u v x^3 y z} = \frac{w^6 u^3 - x^3 - z^3 x + y^4 x v v}{x^3 y z} = d = 9913\frac{10}{16} \therefore v^5 u^3 = d x^2 z y + x^3 + z^3 x - y^4 x v v$ and $\frac{v^4 u^5 x^7 y^2 z}{u v^3 x^7 y^5 z^6} = \frac{v^4 u^3}{y^3 z^5} = m = 15\frac{72791}{340000}$ $\therefore v^5 u^3 = m y^3 z^5 = d x^2 z y + x^3 + z^3 x - y^4 x v v$ from above. Hence $w u = \frac{m y^3 z^5 - d x^2 z y}{x^3 + z^3 x - y^4 x} = 119 = n \therefore u = \frac{n}{v}$ $\therefore u^3 = \frac{n^3}{v^3}$. This put for u^3 above gives $n^3 v^2 = m y^3 z^5$

$\therefore v = \sqrt{\frac{m y^3 z^5}{n^3}} = 7$ the Letter G; and $u = \frac{n}{v} = 17$ the Letter R. Therefore the Lady's Name is GROOME.

Mr. *William Smith* the Proposer's Solution.

Put $m^2 + n^2 = x = w$, and $m^2 - n^2 = z$; then the two first Equations are $128\sqrt{8} m^6 n^6 + 8 m^6 = 28292323,6 = a$, and $3n^3 = 28,637 = b$; $\therefore n^2 = \frac{b^{\frac{2}{3}}}{3} = 4,5$ and $m^2 = \frac{a}{128\sqrt{8} n^6 + 8} = 9$.

Whence by Substitution, $m^2 + n^2 = 14 = w = x$ and $m^2 - n^2 = 5 = z$.

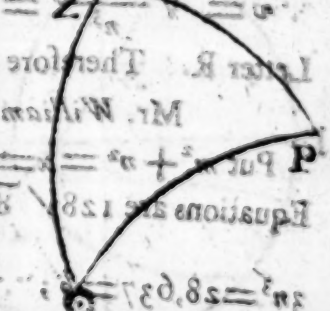
$y^3 - x^3 = 5 = ax$; hence by supplying the deficient Places with 2 ✱'s, the Name is ✱✱OO✱E. By the Nature of Logarithms, in the third Equation $y - 10 = \frac{2184}{\text{L.}\frac{z-1}{z} \div \left(\frac{z-1}{2} + \frac{z-1}{2} \times \frac{z-1}{z} + \frac{z-1}{2} \times \frac{z-1}{z}\right)} = z$; $\therefore y = 12$ and the Name is ✱✱OOME. Let $\frac{m}{v}$ be $= u$; then the two last Equations become $\frac{v^2 m^3 - x^2 - z^3 + y^4 \times vm}{wxyz} = 9913\frac{1043}{1680} = c$, and $\frac{v^2 m^3}{y^3 z^5} = 15\frac{1572791}{5400000} = d$. Whence by Reduction: $v^2 m^3 = cwxyz + x^3 + z^3 - y^4 \times wn = dy^3 z^5$; and $m = \frac{dy^3 z^5 - cwxyz}{x^3 + z^3 - y^4 \times w} = 119$. Consequently $\frac{m}{v} = 17 = u$; and ELIZABETH GROOME is the Name; whence she may be known; and the Encomium proved.

2. Question (162) answered by Mr. *Will. Kingston* of *Bath*.

He presumes the Proposer meant $xy + y^x = 23401$. And $x^{1+y} + y^{1+x} = 124781$; then x and y, will be either 5 or 6; For $6^5 + 5^6 = 23401$; and $6^6 + 5^7 = 124781$; from whence $xy = 15625$ may be either the Number of *Guineas* or *Moidores* and $y^x = 7776$, may be also the Number of *Moidores* or *Guineas*.

* Mess. *Timothy Drury*, *Joshua Hobroyd*, *Matthew Johnson*, *William Smith*, and others, sent us Solutions to this; but the Method of *Trial* and *Error* being too tedious to insert; with Mr. *Goodhead the Proposer*, the Happiness of succeeding in his *Love*, and the Pleasure of counting her *Gold* himself.

3. Question (163) answered by Mr. *Rob. Waddington* of *Hull*.



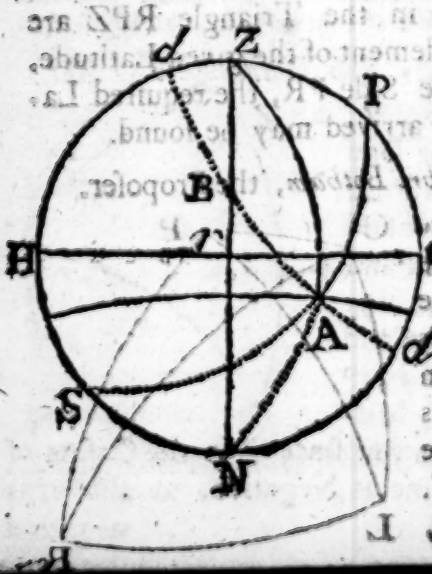
Let P, represent the North Pole, Z, the Zenith, ☉ the Sun's Place at Day Break; then the Side $Z \odot = 108° = Q$, Cosine. Let L and l, the Sine and Cosine of the Lat. D and d, the Sine and Cosine of the Sun's Decl. and n, the Sine of the Sun's Alt. m and n, the Sine and Cosine of the Hour from Noon $= 135°$ $= q$; (*per* a Theorem in *Thacker's* Miscellanies) we have $DL \times dm = Q$; But since Q, is the Cosine of an Angle greater than 90° its Sine is Negative, as also n, is negative

negative. Therefore $DL = dln - Q$; also $R\,1 : L :: a : D$ $\therefore L\,a = D$, and $\sqrt{1-LL} = l$; also $\sqrt{1-LL}\,a\,a = d$; which substituted in the above Equation gives $\sqrt{1-LL} \times \sqrt{1-LL}\,aa = \frac{Q \times aLL}{n}$, and by squaring both Sides $a^2 L^4 - a^2 L^2 - L^2 + 1 = \frac{a^2 L^4 \times 2nQ\,L^2 \times Q^2}{n^2}$. By Reduction $L^4 - n^2 L^4 + n\,L^2 \times \frac{2Q}{a} L^2 = \frac{n^2 - Q^2}{a^2}$; in Numbers, $L^2 + 6,7143\,L^2 = 2,772$. Solved, $L^2 = 0,39$ and $L = 0,6245$ whose Log. is 9,7955324 the Sine of 38° 38′ 44″. the Lat. and $La = 9,5281490$ the Sine of 19° 43′ 3″ the Sun's Declination North; wherefore the Time is *May* 18. and the Place in the Latitude of *Lisbon*.

The same answered by Mr. *Tho. Hare* of *Sheffield*.

Let a = Sine of 18° the Sun's Depression at Day break, $s = \sqrt{\frac{1}{2}}$ = Sine of 45° the Hour from Midnight; b = Sine of 32° 42′ the Sun's Altitude when due East; x = Sine, y = Cosine of the Latitude; and v = Sine, z = Cosine of the Sun's Declination. Then from *Spherics* arise these two Equations $mxyz - vx = a$. And $v = hx$. By 47 *Euclid* 1st, $z = \sqrt{1-b^2x^2}$ and $y = \sqrt{1-x^2}$; and by substituting the respective Values of v, z and y, in the first Equation, we shall after due Reduction have $\frac{x^4 + 4b^2 + b^2 + 1}{b^2} x^2 = \frac{1-a^2}{b^2}$ which solved gives $x = 624634$ = Sine of 38° 39′ 20″ the Latitude; whence the Sun's Declination 19° 43′ 18″ which answers to *May* 18.

The same answered by Mr. *Cha. Mason*, Junior, of *Sapperton*, the Proposer.



Here is given $\begin{cases} ZA = 108°, \text{Co.} \\ = a \\ < ZPA = \\ 135°. \text{ Cosine} \\ = m, \sqrt{B} = \\ 32°\,42' \text{ Sine } n, \end{cases}$ and let x = the Sine and y = the Cosine of the Latitude, v = the Sine, and z = the Cosine of the Sun's Declination: Then (by *Spherics*) $mzy - vx = a$; and as x : (Rad.) :: $v = \frac{v}{x}$, $v = hx$; and per (47. 1. I.) $z = \sqrt{1-}$ and

and $y = \sqrt{1-x^2}$, which wrote for x and y, we have $\sqrt{m^2-m^2v^2-m^2x^2+m^2v^2x^2} - vx = a$ ∴ by Substitution $\sqrt{m^2-n^2m^2x^2-m^2x^2+n^2m^2x^4} - nx = a$. $m^2-n^2m^2x^2-m^2x^2+n^2m^2x^4 = a^2+2anx^2+n^2x^4$ ∴ $n^2m^2x^2+m^2x^2+2anx^2+n^2x^4 = m^2-a^2$. Let b and d express the Coefficients of x^4 and x^2, and then we have $bx^4+dx^2 = m^2-a^2$ ∴ $x = \sqrt{\frac{m^2-a^2}{b} \frac{d^2}{4b^2} - \frac{d}{2b}} = ,6246345$ = the Sine of 38° 39′ 28″ the Latitude N. Hence the Sun's Declination 19° 43′ 18″ answering the 18th of *May*.

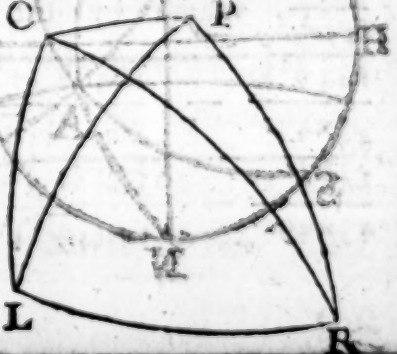
4. Question (164) answered by Mr. *Thomas Moss*.

The Time which the Ship is in Motion is 27 Days, 19 Hours, $\left(=\frac{667\times4}{24}\right)$ and when she has sailed 2668 Miles, and they then perceive the Sun just rising, she will be in the Latitude of 28° 30′ Seven o'Clock *May* 1st, at which Time and Place the Sun's Altitude is easily obtained, and and also his Azimuth from the South. Now

let P represent the Pole, Z the Zenith of the Place the Ship departed from; and let PZE be the Meridian thereof: Moreover let ZS be the Complement of the Sun's Altitude determined as above; RZ = 44° 28′ (the given Distance sailed on the Arch of a great Circle) RS = 90°. Then in the Triangle RSZ are given all the Sides, whence (per *Spherics*) the Angle RZS may be found, and consequently the Sun's Azimuth at Seven o'Clock (= RZS—SZE); again, in the Triangle RPZ are given RZ (44° 28′) ZP the Complement of the given Latitude, and the Angle RZP; whence the Side PR, the required Latitude of the Place where the Ship arrived may be found.

The same answered by Mr. *Abr. Botham*, the Proposer.

Let P be the Pole, L the Place from whence they set sail, C the Place arrived to; and R be the Place in the Horizon the Sun rises at: Now in 667 Hours the Sun will have 15° 4′ Declination its Complement PR = 74° 56′ PL the Com. Lat. of the Place L = 61° 30′. And, since they set sail at Noon,



the Sun in 667 Hours will want 5 Hours of coming to the Meridian PL, therefore $\angle LPR = 75°$ LC is the Distance gone over $=$ 2268 Miles or 44° 28′. And since the Sun is in the Horizon when rising LR $= 90°$. Therefore in the Triangle LPR with two Legs and an Angle the Side LR is found $=$ 69° 54′ and $\angle PLR = 83°\ 26'$. In the $\triangle$ LCR we have now the three Sides, whence the $\angle CLR = 111°\ 53'$. Now CLR $-$ PLR $=$ PLC $= 28°\ 33'$. Therefore in the $\triangle$ PLC is given PL, CL and CLP, from hence the Side CP is found $= 28°\ 13'$ the Com. Lat. of the Place required.

5. Question (165) answered by Mr. *Thomas Moss*.

It is determined by the Writers on Fluxions, that the Solidity of a *semicubical* Paraboloid is $\frac{3}{7}$ of its circumscribing Cylinder; hence we have $3bxy^2 = 7c$ (b being $= 3,1416$ &c. $=$ the given Content of the Bowl in Inches.) Now, the given Equation being $ax^2 = y^3$, we have $x^2 = \frac{y^3}{a}$ and $\therefore x = \frac{y^{\frac{3}{2}}}{a^{\frac{1}{2}}}$; $\therefore \dot{x} = \frac{3}{2} \times \frac{y^2 \dot{y}}{a^{\frac{1}{2}}}$. And $\dot{x}\dot{x} = \frac{9y^2}{4a}$; but, $2by \times \sqrt{\dot{x}\dot{x} + \dot{y}\dot{y}}$ is the Fluxion of the Surface; or, $2by \times \sqrt{\frac{9y^2}{4a} + \dot{y}^2}$ $\left(= 2by\dot{y} \times \overline{1 + \frac{9y}{4a}}^{\frac{1}{2}}\right)$ whose Fluent is $y - \frac{8a}{27} \times \frac{16ba}{45} \times \overline{\frac{9y}{4a} + 1}^{\frac{3}{2}}$; which being properly corrected, becomes $\frac{16bay}{45} - \frac{128ba^2}{45 \times 27} \times \overline{\frac{9y}{4a} + 1}^{\frac{3}{2}} + \frac{128ba^2}{1215}$ for the *Convex* Surface; but, from the above Equation $x^2 = \frac{49c^2}{9b^2y^2}$; and, by the Property of the Curve $x^2 = \frac{y^3}{a}$ $\therefore 49c^2a = 9b^2y^3$ $\therefore a = \frac{9b^2y^5}{49c^2}$ which being substituted for a, in the Expression for the convex Surface we have $\frac{16by}{45} \times \frac{9b^2y^5}{49c^2} - \frac{128b}{1215} \times \frac{81b^4y^{10}}{49c^2)^2} \times \overline{\frac{9y}{36b^2y^5} + 1}^{\frac{3}{2}} + \frac{128b}{1215} \times \frac{9b^2y^5}{49c^2}$, which by the Question is a *Minimum*; or $\frac{144b^3y^5}{45 \times 49c^2} - \frac{10368b^5y^{10}}{1215 \times 49c^2)^2} \times \overline{\frac{441c^2 - 36b^2y^4}{36b^2y^4} + 1}^{\frac{3}{2}} + \frac{144b^3y^5}{45 \times 49c^2} - \frac{10368b^5y^{10}}{1215 \times 49c^2)^2} \times \overline{\frac{441c^2}{36b^2y^4} + 1}^{\frac{3}{2}} + \frac{128b}{1215} \times \frac{81b^4y^{10}}{49c^2)^2}$

a *Minimum*

Minimum. Now call $\frac{144b^3}{45\times 49c^2}$, d; $\frac{10368b^6}{1215\times 49c^2}$, f; $\frac{144c^3}{36b^2}$, m; and $\frac{1286\times 8164}{1215\times 49c^2}$, n; then the Expreſſion for the *Minimum* becomes $\frac{d-fs}{y}\times\overline{m+y^4}^{\frac{3}{2}}+ny^{10}$, which being put into *Flux.* &c. the Value of y may be known, and conſequently that of x.

The Method of Solution for the latter Part of the Queſtion (*or rather the ſecond Queſtion, becauſe the Data's have no Connexion with each other*) will be as follows,

Firſt then, the given Equation will be $\overline{x^2+x^3+x^4}\times\frac{3x}{2}=\frac{3}{p}\times\overline{x^x}^x$ (p being $=7854$) whence this Equation in Log ſtands thus $L\overline{x^2+x^3+x^4}+Lx\times\frac{3x}{2}=L\frac{3}{p}+x\times Lx^x$ ∴ L. Log. $\overline{x^2+x^3+x^4}+L.\frac{3x}{2}+L.\,Lx=L.\,L\frac{3}{p}+Lx+x\times Lx$; whence, by the Method of *Tryal* and *Error*, and a common Table of Log. the Value of x may be obtained, and conſequently $\overline{x^x}^x$ the required Content of the Glaſs.

Mr. *Will. Smith*, ſent us the following Solution.

Put $a=\frac{1}{12}$; $s=115,5$ cubic Inches, the Content of the Bowl; $c=\frac{3,1416\times 3}{5}=1,88496$, and $y=$ greateſt Semiordinate within; then (from p. 209. of Mr. *Emerſon's* Fluxions) $\frac{s}{cy^2}=$ correſponding Abſciſſæ, ∴ $\frac{s+cay^2}{cy^2}$ and $y+a$ are the Abſciſſa and Semiordinate including the Silver; whence $\frac{s+ca\overline{y+a}^2}{y^2}\times\overline{y+a}^2-s=$ Solidity of the Silver, a *Minimum*; and by making y flow, we have $2cay^3\dot{y}+2ca^2y^2\dot{y}-2say^2\dot{y}-2sa^2y\dot{y}=0$. Reduced $y^4+ay^3-\frac{s}{c}y=\frac{sa}{c}$. Solv'd $y=3,942392994$ Inches; whence $\frac{s}{cy^2}=14,007621$, the greateſt Abſciſſæ within, and 7.980157 cubic Inches, or (*per Ward's* Math. p. 121) 3*lb.* 8*oz.* 6*pw.* 21,0624*gr.* of ſtandard Silver is the Quantity required.

It is ſufficiently evident, that $\overline{x^x}^x$, admits of two Caſes, as follows,

Caſe

Case 1. Put d (=,7854×$\frac{1}{3}$)=,2618; then by the Quest. and Stereometry, $\overline{x^{x+1}+x^2+x^{2x}} \times dx \frac{3x}{2} = x^{3x} dx = x^{3x}$

whence Log. Log. $x^{x+1}+x^2+x^{2x}$+Log. d+Log. $x \times \frac{3x}{2}$ —Log. Log. x— Log. $x \times 2 = 0$. Assume $x = 1,1$, whose Log. =0,0413927; and the Equation gives + 0,00210107. Taking $x = 1,096$, Log. = 0,398106, we get 0,03807369. Whence $\frac{0,0413927 - 0,398106 \times 0,03807369}{0,00210107 + 0,03807369} = 0,0014993$ to which +0,039810 6=0,0413099=Log. of 1,09979=x, with which the Equation gives + 0,0002475. Taking x= 1,09975 whose Log. = 0,0412939; we get 0,0001094. And operating as above, we have 0,0000049 to be added to 0,0412939=0,0412988=Log. of 1,099762 Inches=x, the leſſer Diam. ∴ x^x=1,110245 the greater Diameter $x^{\frac{3x}{2}}$ = 1,169845 the Depth; and 1,1218891 is the Content of the Glaſs; conſequently each *Mathematician* muſt drink (Log. 115,5— Log. 1,1218891 — Log. 3=) 34,317115 Times to empty the Bowl.

Caſe 2. From above, $\overline{x^{x+1}+x^2+x^{2x}} \times dx \frac{3x}{2} = x^{3x}$

and Log. Log. $x^{x+1}+x^2+x^{2x}$+Log. d+Log. $x \times \frac{3x}{2}$ — Log. Log. x—Log. $x \times x = 0$. Hence by Approximation and operating as above, x is had = 1,0960212 Inches, the leſs Diameter, whence x^x = 1,1057132 Inches, the greater Diameter, $x^{\frac{3x}{2}}$ = 1,1626894 the Depth; and 1,1066965 is the Content of the Glaſs, conſequently each *Mathematician* muſt drink $\left(\frac{115,5}{1,1066965 \times 3}\right)$ = 34,788213 Times to empty the Bowl. Q. E. I.

6. Queſtion (166) anſwered by Mr. *Will. Kingſton* of *Bath*.

Given $ay^2 - \frac{\dot{y}\dot{y}^2}{\dot{x}} - y^2\dot{y}^2 - a\dot{y} = 0$. By ſubſtituting $-\frac{\dot{y}\dot{x}}{\dot{x}}$ for $\ddot{y}$, we ſhall have $a\dot{y}^2 - \frac{\dot{y}\dot{y}^2}{\dot{x}} - y^2\dot{y}^2 - \frac{a\dot{y}\dot{y}\dot{x}}{\dot{x}} = 0$. Hence $a\dot{y}^2\dot{x} - \dot{y}\dot{y}^2 - y^2\dot{y}^2\dot{x} - a\dot{y}\dot{y}\dot{x} = 0$. $a\dot{y}\dot{x} - \dot{y}\dot{y}x - a\dot{y}\dot{x} = 0$. Then making $\dot{x}$ conſtant

onstant, and finding the Fluent, we have $ayx - \frac{y^2\ddot{y}}{2} - \frac{y^3\dot{x}}{3}$ $- ayx = 2ay\dot{x} - \frac{y^2\dot{y}}{2} - \frac{y^3\dot{x}}{3y^3} = 0$. And by finding the *Fluent* gain, we have $2ayx - \frac{y^3x}{6} - \frac{y^3x}{3y^2} = 0$. $\therefore 12ax - y^3 - 2y^2x$ $= 0$. $\therefore 12a - 2y^2 \times x = y^2$ $\therefore x = \frac{y^2}{12a - 2y^2} = \frac{y^2}{12a} + \frac{y^4}{72a^2} +$ $\frac{y^6}{432a^3} + \frac{y^8}{2592a^4}$ &c.

The same answered by Mr. *Thomas Moss*.

By writing $-\frac{\ddot{y}x}{\dot{x}}$ for $\ddot{y}$ (according to what is demonstrated L. D.) the given Equation will be reduced to $a\dot{y}x - y\dot{y}^2 - y^2\dot{y}$ $- ay\dot{x} = 0$. Assume $\dot{x} = \dot{y}x$ $Ay + By^3 + Cy^5$ &c. Then $\ddot{x} = \dot{y}_1 x$ $+ 3By^2 + 5Cy^5$ &c. And by substituting these Values, the Equation will become $\left.\begin{matrix} 2Ay + 4aBy^3 + 6aCy^5 + 8aDy^7 \text{ &c.} \\ - y - Ay^3 - By^5 + Cy^7 \text{ &c.} \end{matrix}\right\} 0.$ Whence by comparing the homologous Terms $A = \frac{1}{2}a$, $B = \frac{1}{2.4a^2}$, $C = \frac{B}{6a} = \frac{1}{2.4.6a^3}$ &c. Hence $\dot{x} = \dot{y}x$ $+ \frac{y^3}{2.4a^2} + \frac{y^5}{2.4.6a^3}$ &c. And consequently $x = \frac{y^2}{2.2a} +$ $\frac{y^4}{2.4.4a^2} + \frac{y^6}{2.4.6.6a^3} + \frac{y^8}{2.4.6.8.8a^4}$ &c.

Mr. *Will. Smith* answers the same as follows.

In the given Equation, write $\frac{\ddot{y}x}{\dot{x}}$ for its equal $-\ddot{y}$ (as is demonstrable) then divide by $\dot{y}$, and bring it out of Fractions, we have $a\dot{y}\dot{x} - y\dot{y}^2 - y^2\ddot{y}\dot{x} + ay\dot{x} = 0$. Assume $x = Ay^n + By^{n+3}$ $+ Cy^{n+5} + Dy^{n+7} + y^{n+9}$ &c. Then writing $n\,Ay^{n-1}$ $\dot{x}$ and $n-1\,a\,Ay^{n-2}$ for $\dot{x}$ and $\ddot{x}$, it becomes, $an\,Ay^{n-1}\dot{y} - n - Ay^{n-1}$ $\dot{y} - n.\ n-1.\ Ay^{n-1} = 0$. Wherein $n-1$ and 1, being the least Indices, we have $2n-2=1$; $\therefore n = \frac{3}{2}$; which wrote for n above and properly ordered we get $x = Ay^{\frac{3}{2}} + By^{\frac{5}{2}} + Cy^{\frac{7}{2}} + Dy^{\frac{9}{2}}$ $+ Ey^{\frac{11}{2}} + Fy^{\frac{13}{2}}$ &c. Hence by common *Fluxionary* Principles $B = \frac{3A}{25a}$, $C = \frac{3A}{252a^2}$, $F = \frac{1}{32}$ &c. And A D, E may be taken at pleasure equal to b, c, d; consequently $x = by^{\frac{3}{2}} + \frac{1}{4a}y^{\frac{5}{2}} + \frac{3b}{25a^2}$ $+ cy^{\frac{7}{2}} + dy^{\frac{9}{2}} + \frac{1}{32}y^{\frac{13}{2}}$ &c. *W. W. R.*

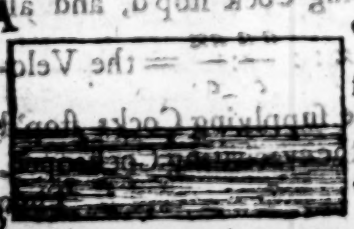
7. Quest.

7. Queſtion (167) anſwered by Mr. *Tho. Moſs.*

This Queſtion (I humbly apprehend) in the Manner it is propoſed, is unlimited; the Ratio of the Denſities of the Bodies, as well as their Times of Rotation, ought to be given: Now the equatorial Diameter and the Axis of the Earth being in the Ratio of 230 to 229 (by NEWTON's *Principia*, vol. ii. p. 243.) And the Difference between the two Diameters being always as the Radii directly, and the Square of the periodic Time inverſely; but, in this Caſe, we are to conſider only the Ratio of the two Diameters; which Ratio, it is plain, will be truly effected by the Denſities and the Times of Rotation, without regarding the Magnitudes of the Bodies. Moreover ſince the Squares of the periodic Times of the *Earth* and *Jupiter*, are in the Ratio of 29 to 5; and that of their Denſities as 400 to $94\frac{1}{2}$; it follows (becauſe the Difference of the two Diameters of two equal Bodies, equally denſe, are as the Squares of the Times of Rotation inverſely) that $29 : 1 :: 5 : \frac{29}{5}$ which is as the Difference of the equatorial and polar Diameters of a Sphere whoſe Time of Revolution is 9^h 56′. and Denſity equal to that of our Earth: But as 400 (as the Denſity of the Earth) $: \frac{29}{5} :: 94\frac{1}{2}$ (as the Denſity of Jupiter) $: \frac{400}{94\frac{1}{2}} \times \frac{29}{5}$; which is as the Difference of the Diameters of Jupiter; ∴ as $\frac{400}{94\frac{1}{2}} \times \frac{29}{5} : 229$, or as $\frac{400}{94\frac{1}{2}} \times \frac{29}{5} \times \frac{1}{229} : 1$ (and not as $\frac{29}{5} \times \frac{94\frac{1}{2}}{400} \times \frac{911}{2} : \frac{229}{1}$ to 1. which muſt be an Error of the Preſs, in NEWTON's Prin. vol. ii. p. 244) ſo is the Difference of the Diameters of Jupiter to his leſſer Diameter, that is as 1 : 9.34 nearly: Hence the polar Diameter of Jupiter is to his Diameter from Eaſt to Weſt: as 9.34 : 10,34 nearly. After the very ſame Manner the Ratio of the Diameters of the other bodies are determined, when the Times of their Rotations and Denſities are known.

8. Queſtion (168) anſwered by Mr. *Tho. Hare*, of *Sheffield*.

Let AB = *b*, *s* = 600″, *a* = 3600″, *b* = 4800″, *c* = 7200″, CB = *x*, and *t* = Time of filling to C; then the Time of emptying, the ſupplying Cock being ſtop'd is $\frac{abc}{ab + ac + cb} = 1600''$, which put = 2*p*, and the Time of emptying with the firſt Velocity is known



nown to be $= p$; then $s : b :: 1 : \frac{b}{s} =$ the Velocity of uni-
rm filling; the evacuating Cocks being ſtopped, and
$b : 1'' :: \frac{b}{p} :$ the Velocity of Deſcent at the firſt Inſtant, the
pplying Cock being ſtop'd: Again $\sqrt{b} : \sqrt{x} :: \frac{b}{p} : \frac{b\sqrt{bx}}{p} =$
formal Velocity of Deſcent the ſupplying Cock being
p'd; then $\frac{b\sqrt{bx}}{p} - \frac{b\sqrt{bx}}{s} =$ abſolute Velocity of the Surface up-
ards at C, all the Cocks being open. Again $\frac{pb - s\sqrt{bx}}{ps}$
$\dot{x} : \dot{t} = \frac{sp}{\sqrt{b}} \times \frac{\dot{x}}{pb - s\sqrt{bx}}$; whoſe correct *Fluent* is $t = \frac{2ps}{s}$
Hyp. Log. $\frac{p\sqrt{b}}{p\sqrt{b} - s\sqrt{x}} = \frac{2p\sqrt{x}}{s\sqrt{b}}$; and whence $x = b$, the
hole Time of filling is $= \frac{2ps}{s} \times$ Hyp. Log. $\frac{p}{p-s} - 2p =$
37' 25".

Mr. *Tho. Garrard*, the Propoſer's own Solution.

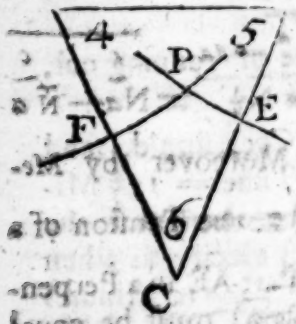
First $\frac{1}{\frac{1}{60} + \frac{1}{80} + \frac{1}{120}} = 26\frac{2}{3} =$ the Time of running out,
poſing the Ciſtern full, and the ſupplying Cock ſtop'd, and
the evacuating Cocks open; but half this Time $= 13\frac{1}{3}$ Mi-
tes is the Time in which the ſame would be emptied if the
acuating Cocks always ran with the ſame Velocity as when
Ciſtern is quite full, which call c, and let $s = 10$ Minutes
Time of filling by the ſupplying Cock, $= aa =$ the whole
ight of the Ciſtern, and zz any variable Height of the
ater within at the End of any Time t. Then will $\frac{aa}{s} =$ the
locity *per* Minute of uniform filling by the ſupplying Cock.
en the evacuating Cocks are ſtopped $\frac{aa}{c} =$ the Velocity *per*
inute, with which the Water would at firſt be depreſſed,
poſing the Ciſtern full, the ſupplying Cock ſtop'd, and all
evacuating Cocks open. But $a : z :: \frac{aa}{c} : \frac{aaz}{c} =$ the Velo-
y of Deſcent at any Height z { the ſupplying Cocks ſtop'd & the evacuating Cocks open.

Then

Then $\frac{aa}{s} + \frac{az}{c}$ = the absolute Velocity of filling supposing the Cocks open: Consequently $\frac{2zz}{\frac{aa}{s} - \frac{az}{c}} = \dot{t} = \frac{2zzc\dot{z}}{caa - saz}$ whose Fluent corrected (from Form the 4th of *Emerson's* Fluxions) is $t = \frac{2ccL}{s} \times \text{Log.} \frac{ca}{ca - sz} - \frac{2cz}{a}$ for the Time of filling up to any Height z; and when z^2 becomes $= a^2$ (the whole Height) then t, (the whole Time of filling the Ciftern) becomes $\frac{2ccL}{s} \times \text{Log.} \frac{c}{c-s}$ less $2c =$ 22,6232263 Minutes.

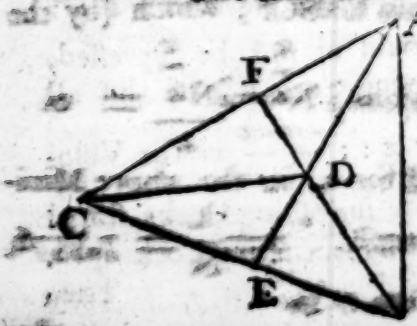
9. Queſtion (169) anſwered by Mr. *Thomas Moſs*.

As neither the Time of Deſcription, nor the Poſition of the Perſon at any one Inſtant is given, therefore conclude this Prob. requires nothing further, than to determine in what Track a Perſon paſſing along the Street, muſt always keep in, ſo that he ſhall have the leaſt Quantity of the Rays of Light falling upon him, in any aſſigned Time; or, which is the ſame, he ſhall always keep in the darkeſt Part of the Street.



Let A and B, repreſent the two Lamps on one Side of the Street, and C that on the other Side; join AC and BC; and take BE to CE in the Ratio of 5 to 6, alſo take AF to CF, as 4 to 6. Then if, by Theorem 15. p. 74. *Simpſon's* Geometry, two Circles be deſcribed, the Peripheries thereof will interſect in a Point P; whence it is manifeſt that the Perſon muſt deſcribe the Arches of two different Circles, and it is moreover evident that he muſt both *begin* and *end* his Path on that Side of the Street whereon the two Lamps are placed. The Method of determining the Magnitudes of the ſaid Circles, or the Diſtance, between any two aſſigned Poſitions is very obvious from the above Quotation.

The ſame anſwered by Mr. *Wm. Kingſton*.

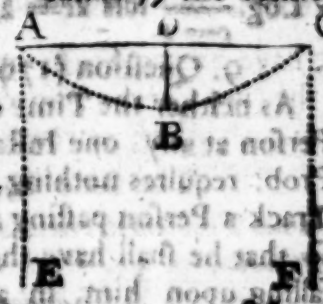


Given AB=34, BC=40, and AC =42; then by the Prop. of Light $\frac{6}{EC^2} = \frac{5}{BE^2}$; hence EC=19,058 BE=20,912 and $\frac{6}{CF^2} = \frac{4}{AE^2}$; hence FC=23,122 and AF=18,878; and by the Pr. $\frac{4}{} = \frac{5}{} = \frac{6}{}$ [illegible]

whence AD, BD and CD are found in Proportion as 1, 1.118, and 1,225. Then in the Triangle ABE are known two Sides, and the included Angle; from whence the Angle BAE is found 63° 27'; then, in the Triangle ABD, are known the Angle A, and the Ratio of the Sides AB, and BD, as 1 to 1,118 from whence are found AD = 19.412, and BD = 21,707, and DC will be found = 25,988, from whence the Path is determined.

10. Question (170) answered by Mr. *Tho. Allen* of *Spalding*, *Lincolnshire*.

Put AB (half the Length of the Curve) = z, the Abscissa DB = x; then (the Curve ABC being the * *Catinary*) the Semiordinate AD = DC (c) will be = *Hyp.* Log. $\frac{z+\sqrt{aa+zz}}{a}$; or $\frac{c}{a}$ = *Hyp. Log.* $\frac{z+\sqrt{aa+zz}}{a}$; which Equation, by putting N = the Number whose *Hyp.* Log. is Unity, becomes $N^{\frac{c}{a}} = \frac{z+\sqrt{aa+zz}}{a}$ ∴ $a^2 N^{\frac{2c}{a}} - 2aN^{\frac{c}{a}} + z^2 = a^2 + z^2$; whence $z = \frac{a^2 N^{\frac{c}{a}} - aa}{2a N^{\frac{1}{2}}} = N^{\frac{c}{a}} - N^{\frac{c}{a}}$ $\times \frac{a}{2}$; and $\sqrt{aa+zz} = N^{\frac{c}{a}} + N^{\frac{c}{a}} \times \frac{a}{2}$. Moreover by *Mechanics*, $\dot{x} : \left(\frac{z\dot{z}}{\sqrt{aa+zz}}\right) :: z : z : \sqrt{aa+zz}$ = the Tension of a Particle of the Chain at A, sustaining the Part AE in a Perpendicular Direction, which Tension (it is plain) must be equal to the Weight of that Part; and the Weights of any two Parts of the Chain being as their Lengths, it follows, that $\sqrt{aa+zz}$ expresseth the Length of the Part AE, or CF.



Therefore $2\sqrt{aa+zz} + 2z$, or its equal $2aN^{\frac{c}{a}}$ will be = 20 (L) the whole Length of the Chain EABCF; which (by the Question) is a *Minimum*. In Fluxions $\dot{a}N^{\frac{c}{a}} - \dot{a}N^{\frac{c}{a}} = 0$.

Whence $c = a$, which substituted for a, in the above Minimum, and value of z; we get $2a = L$ ∴ $2c = \frac{L}{N} = 7,3576$,

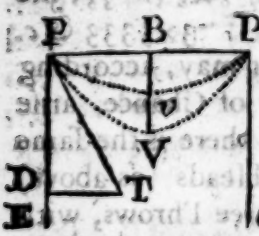
* See *Landen's* Lem. p. 34.

the Length of the horizontal Line AC, and $2z = N - \frac{1}{N} \times =$ 8,64664, the Length of the Curve ABC, when the given Chain is the ſhorteſt that will poſſibly hang at Liberty, upon the two Supporters at that Diſtance. Again, ſince the Chain will reſt in two different Poſitions upon the Pins, it is obvious, that a will have two real and poſitive Roots, in the Equation $2a\overset{c}{N}_{a} = L$, which two Values (4,884, and 2,5935) being ſeparately ſubſtituted for a, in the Equation $z = \overset{c}{N}a - \overset{c}{N}^{a} \times \frac{1}{2}$, we have $2z = 7{,}6146$, and $2z = 9{,}3274$ Inches, the Lengths of the two Curves reſpectively, when the Pins are 7 Inches from each other, as required.

The ſame anſwered by Mr. *Tho. Moſs.*

This *Problem* is eſſentially the ſame, as that in *Landen's* Lucubrations, p. 33. from whence it appears to have been taken. The ingenious Mr. *Landen* has there proved the *Curve* to be the *Catinary*; and has alſo determined the Length of the Curve, when the whole Length of the Chain, and the Diſtance of the Pullies (or Pins) are given: Moreover in his *Scholium* he determines, *the Length of the ſhorteſt Chain which can poſſibly reſt ſuſpended*, &c. Whence as the Length is (by *Tabularius*) given, the required Diſtance of the Pins, and the Length of the Curve, from the ſaid *Sch.* becomes known.

The Solution by *Tabularius* (the Propoſer) is as follows.



It is evident, that the Ends of the Chain, hanging perpendicular from each Pin, muſt be equal, in the ſame Curve, to preſerve the *Equilibrium*. Put $EP + PV = e\,P + Pu = 10 = c$, BV or $Bu = x$, $PB = y$, Pu or $PV = PD = z$; then will the Force drawing in the Direction of the Curve at v, or $V = a = DT$ parallel to PB, and the Tangent $PT = a + x = \sqrt{a^2 + z^2} =$ the Tenſion of the Curve at P, which (by the Nature of the Queſtion) muſt be equal to the Weight of the Part (PE) of the Chain drawing in a perpendicular Direction; whence $z + \sqrt{a^2 + z^2} = c \therefore z = c - \frac{a^2}{c}$: And putting A, C, and Y, for the Hyp. Log. of a, c, and y, we have (by the Property of the *Catenaria*) $y = aC - aA$, a *Maximum* $\therefore Ca - Aa - a = 0$.

(putting

Putting $\frac{1}{a}$ for A) whence $A=c-1=1,302585$; which, put for A in the *Maximum*, gives $y=a=3,6788$, $\therefore z=7,3576$; and $2x=8,646644$. Now, because $y=a$, and $\therefore C-Y=1$, when Y is a *Maximum*, it appears that, when C—Y is greater than Unity, a will have two Values in the Equation $y=aC-a^A$; or, $\frac{1}{a}+A=C$; and $\therefore$ the Chain will then reſt in two Poſitions: And taking $y=3,5$; I find $a=2,593137$, and $2x=9,327564$, the Length of the Curve PVP; alſo $a=4,8839$, and $2x=7,614752$, the Length of the Curve PvP.

11. Queſt. (171) anſwered by Mr *Tho. Moſs*, the Propoſer.

Firſt, it is very plain, that B (before he begins to throw) has the very ſame Probability of throwing either more or leſs (let which will be aſſigned) than 35 Heads at 7 Throws, as A has of throwing more or leſs (but one muſt be aſſigned) than 42 Points at 4 Throws, with 3 Dice, allowing all the Points to be reckoned, when an Ace (or more) ariſes. $\therefore$ it is plain, B has the ſame Probability of throwing 37 Heads (becauſe by the Queſtion 7 came in the firſt Throw) as A has of throwing 42 Points without any ſuch Reſtriction as mentioned in the Problem.

Now conceive a ſingle *Die* on which there is no *Ace*; then the Probab. of throwing 3,333 &c. at one Throw; or, which comes to the ſame, of throwing 10 at 3 Trials is the very ſame as B had of throwing 37 (as above); but if ſuch a ſingle *Die* be thrown twice, we may according to an Equality of Chance, have $3,333\ \&c. \times 2 \times \frac{1}{2} \times \frac{1}{2}$; becauſe the Probab. of getting 6,666 &c. (3,33 &c. $\times$ 2) is, it is evident, only $\frac{1}{2}\times\frac{1}{2}$ ($=\frac{1}{36}$, the Probability of an Ace miſſing twice together); $\therefore 3\times 3333\ \&c. \times\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}$ ($=10\times\frac{1}{216}=5,787\ \&c.$ what may, according to the Nature of the Queſtion, and the Laws of Chance, ariſe in one Throw with three ſuch Dice; that is, there is the ſame Probability for it, as B has of throwing 37 Heads (as above) therefore 17,361 &c. is what may ariſe in three Throws, with three Dice, whence 23,361 &c. is what may ariſe, becauſe ſix came in the firſt Throw; therefore as $38\{37+1$; becauſe A by the Queſtion muſt throw 1, at leaſt, more than B to win 23,361 &c. $\therefore$ B's Chance of Winning to that of A's $\therefore$ B ought to have $\frac{38}{61,361\ \&c.}$ of 5 Guineas, *minus* his own Stake ($=1,096\ \&c.+2$) $=$ 1,096 &c. $=$ 1*l*. 3*s*. 0$\frac{1}{4}$ very near;

Or thus, B has $\frac{38}{61,361\ \&c.}$ for a Probability of winning three Guineas, and A has only $\frac{23,361\ \&c.}{61,361\ \&c.}$ for a Prob. of winning 2 Gu. whence $\frac{38}{61,361\ \&c.}$ of 3 Guineas *minus* $\frac{23,361\ \&c.}{61,361\ \&c.}$ of 2 Guineas $= 1,096\ \&c.$ (the ſame as above) what B ought to receive of A to give him (the latter) back his three Guineas, *i. e.* to draw the Wager.

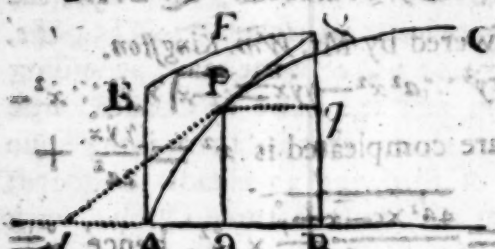
Otherwiſe.

It is evident that B has the ſame Prob. of throwing 37 Heads (becauſe 7 came in the 1ſt Toſs, by the Qu.) as A has of throwing 42 Points at 4 Throws with 3 regular Dice; but the Prob. of A's miſſing all the Aces in the 3 Throws is $\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}\ (=\frac{125}{216})$ ∴ it is plain that, according to an Equality of Chance, A can only expect one Trial and $\frac{125}{216}$ of a Trial; in which, with 3 Dice, according to the Circumſtance of the Prob. he has a Probability of getting $10+7,361\ \&c.\ (10+\frac{1,59\times 10}{216})$ therefore A has the ſame Probability (as B of getting 37 Heads) of getting $17,361\ \&c.$ ($+6$ which came in the firſt Throw) $= 23,361\ \&c.$ the very ſame as above.

N. B. Mr. *Moſs* deſires it may be obſerved, that his Solution is given only as an *Approximation*: And we muſt acquaint our Contributors, that we received no other Solutions.

12. Queſt. (172) anſwered by Mr. *Tho. Allen* of *Spalding*.

Let A repreſent the Place of the *French* Ship, and E that of the *Engliſh*, at the Beginning of the Chaſe; P and Q, two other cotemporary Poſitions of them, while the former is purſuing the latter. Continue QP, till it interſects Ba A, the Axis of the Parabola APC, continued in *d*, and Pa, and QB being perpendicular, and P*q* parallel to the ſaid Axis; call the Parameter of the Parabola, p; A a, v; A B, x; BQ, y; and AE $= a$; then, by the Nature of the Parab. a *d* will be $= 2v$, P*d* $= \sqrt{pv+4vv}$; and by ſim. Triangle $\sqrt{pv+4vv} : 2v :: y$



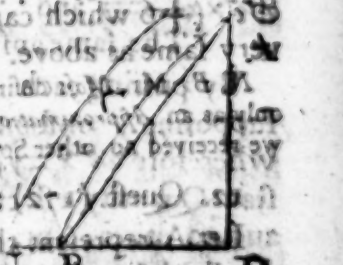
$P\mathit{q} = \frac{2av}{\sqrt{pv+4vv}}$; $\sqrt{pv+4vv} : \sqrt{pv} :: a : Q\mathit{q} = \frac{a\sqrt{pv}}{\sqrt{pv+4vv}}$. It is obvious therefore, that $x + \frac{2av}{\sqrt{pv+4vv}} = y$

$=x$; and $\sqrt{pv}+\frac{av\sqrt{pv}}{\sqrt{pv+4vv}}=y$: From which two Equations, by exterminating v, will be obtained the Equation of the Curve EFQ in which the Point Q will always be found; or the Track which the Frigate described whilst she was pursued.

Moreover since the Abscissa, and Ordinate of a Semiparabolic Curve, are given $=8$ and 5 Miles respectively; call them x, and y; then will $\frac{y\sqrt{\frac{1}{4}p^2+y^2}}{p}+\frac{1}{4}p\times H.\ Lo.\frac{y+\sqrt{\frac{1}{4}p^2+y^2}}{\frac{1}{2}p}$ $=10,465$ Miles, be the Length of that Curve, or Distance sailed by the *French* Ship of War; therefore, the Distance sailed by the *English* Frigate during the Chase, if from thence found $=13,081125$ Miles. *Q. E. I.*

The same answered by Mr. *Joshua Holdroyd*.

Let ACB be the Track described by the Man of War, then by the Question AB $=10$ and AD $=8$, also DB $=6$; consequently the Length of the Curve is $=10\ 678258=$ the Length of the Track described by the Man of War; and then (by the Question) $4:5::10,678258:13,347822=$ the Length of the Track described by the Frigate: Also because they bore away with an uniform Velocity, and always kept the same Distance from each other, it is evident, that the Curve will be the same with the foregoing (*viz.*) a Parabola. *Q. E. I.*



13. Quest. (173) answered by Mr. *Wm. Kingston*.

Given $a^2\dot{x}^2=y\dot{y}x-x\dot{y}^2+c\dot{y}^2$ $\therefore a^2\dot{x}^2-y\dot{y}x=c-x\times\dot{y}^2$ $\therefore \dot{x}^2-\frac{y\dot{y}\dot{x}}{c-x}=\frac{c-x}{a^2}\times\dot{y}^2$. The Square compleated is $\dot{x}^2=\frac{y\dot{y}\dot{x}}{2a^2}+\frac{y^2\dot{y}^2}{4a^4}=\frac{4a^2\times c-x+y^2}{4a^4}\times\dot{y}^2$, hence $\dot{x}=\frac{y}{2a^2}\sqrt{4a^2\times c-x+y^2}+y$. Also $c-x\times\dot{y}^2+y\dot{y}\dot{x}=a^2\dot{x}^2+\dot{y}^2$ $\therefore \frac{y\dot{y}\dot{x}}{c-x}=\frac{a^2\dot{x}^2}{c-x}$. ☐C is $y^2-\frac{y\dot{x}y^2}{c-x}+\frac{y^2\dot{x}^2}{4\times c-x^2}=\frac{a^2\dot{x}^2}{c-x}+\frac{y^2\dot{x}^2}{4\times c-x^2}$ $\therefore \frac{4a^2\times c-x+y^2}{4\times c-x^2}\times\dot{x}^2=\dot{y}^2$ $\therefore \dot{x}=\frac{\dot{y}}{2c-2x}\times\sqrt{4a^2\times c-x+y^2}$

This put for the above, gives $x = \frac{\sqrt{4a^2 \times c - x + y^2} - y}{2c - 2x}$

$\sqrt{\frac{4a^2 \times c - x + y^2}{2a^2}} - y$. That is, $4a^2c - 4a^2x = 4a^2 \times \frac{}{c-x} + y^2 - y$

Whence the correct Fluent is $\frac{a^2x^2}{2} = \frac{y^2x}{2} - \frac{y^2x}{2} + \frac{cy^2}{2} =$

$\therefore$ it is plain that $\dot{y}\dot{x} - x\dot{y}\dot{x}\dot{y} = 0$. By making $\dot{x}$ constant, and finding the Fluent, we have $\frac{y^2\dot{x}}{2} = xy\dot{y}$ and finding the Fluent again $\frac{y^2x}{2} = \frac{xy^2}{2}$ which confirms the above.

The same answered by *Tabularius*.

Making $\dot{x}$ Fluxion constant, the given Equation in Flux. $\ddot{y}\dot{y}\dot{x} - 2x\dot{y}\ddot{y} + 2c\dot{y}\ddot{y} = 0 \therefore \dot{x} = \frac{2\dot{y} \times x - c}{y}$; which being wrote for $\dot{x}$ in the given Equ. it becomes $\frac{4a^2\dot{y}^2 \times x - c}{y^2} = \dot{y}^2 \times x - c$. $4a^2 \times x - c = y^2$ and $\therefore y = 2a\sqrt{x - c}$.

The same answered by Mr. *T. Allen*, the Proposer.

By putting each Side of the given Equation into *Fluxions*, supposing $\dot{y}$ constant, we get $2a^2\dot{x}\dot{x} = y\dot{y}\dot{x} + y^2\dot{x} - x\dot{y}^2 + c\dot{y}^2$, wherefore $2a^2\dot{x} = y\dot{y}$; whose Fluent is $4a^2x = y^2 +$ some constant Quantity effected with c, which Quantity must be $= 4a^2c$, and no other; for, it is plain, that, when x becomes equal to c, y is then $= 0$, or is just beginning to exist. Therefore $4a^2x = y^2 + 4a^2c$, is the correct Equation of the Fluents.

But to find the same according to the Restrictions of the Problem, we have, from the Equation $2a^2\dot{x} = y\dot{y}$; $\dot{y} = \frac{2a^2\dot{x}}{y}$, which substituted for $\dot{y}$ in the original Equation, gives $a^2\dot{x} = \frac{4a^4x^2\dot{x}^2 + 4ca^4x^2}{y^2}$; whence $y^2 = 2y^2 - 4a^2x + 4a^2$ $4a^2x = y^2 + 4a^2c$. The very same as before. *Q. E. F.*

General Remarks, *&c.*

Tabularius observes in the Solution to Qu. 159. that there is a Miſtake, occaſioned, by ſuppoſing the Diameter and Ordinate to be at right Angles; which can only be when the Triangle is *Iſoſceles*. His Solution is as follows.

The Triangle ABC being given, the Line BD which biſects the Baſe is alſo given. Parallel to AD draw EF to the Point of contact

ontact; and put BD=b, AD=DC=d;
ine ⊥ at D=v; the Diameter DO=v,
nd the Parameter to that Diameter=p:
Then will BO=OF=$b-v$; and by ſim.

$\Delta : b : d ;: 2\sqrt{b-v} : \frac{2d}{b}\times\sqrt{b-v}=EF=\sqrt{b-v}^{\frac{1}{2}}$ by the Property of the Parabola
$p=\frac{4d^2}{b^2}\times b-v$, and $\frac{4d^2v}{b^2}\times b-v=$

$GD^2=DH^2$, whence $GH=\frac{4d}{b}\sqrt{bv-v^2}$; and the Area of the
Parabola $=\frac{8dsv}{3b}\sqrt{bv-v^2}$; a Maximum, in Fluxions, $3bv^2\dot{v}-$
$4v^3\dot{v}=0$, $\therefore v=\frac{3b}{4}$, whence $GH=d\sqrt{3}$, and the Area $=$
$\frac{3bd\sqrt{3}}{8}$.

If AC $=\begin{Bmatrix}75\\70\\65\end{Bmatrix}$ then BD $=\begin{Bmatrix}56,18\,\&c.\\60,8276\\64,857\end{Bmatrix}$ DO $=$
$\begin{Bmatrix}42,135\\45,62\\48,6427\end{Bmatrix}$ GH $=\begin{Bmatrix}64,95\,\&c.\\60,62\\56,29\end{Bmatrix}$ and, in every Caſe, the
Area of the Parabola $=1818,66\,\&c.$

Cor. The Area △ : the Area of the Parabola : : 2 : $\sqrt{3}$
Univerſally, let the Sides of △ be what they will; and when
$p=1$, the △ will be *Iſoſceles*.

Mr. Rob. Marſh obſerves, that Mr. *Haycroft's* Ænigma N°. (5) 119, is copied from *The Muſe in good Humour*, &c.

We again return Thanks to our worthy and ingenious *Contributors* for the Aſſiſtance and Encouragement they give, in this Undertaking; deſiring (as before) that they will ſend us *things* entirely *new*; and alſo, that their *Schemes* may be drawn as perfect as poſſible, and of a proper *Size* for the *Diary*; as well as bring out all *Equations* in *Numbers* &c. and further (as ſeveral Letters came too late to be inſerted this Year) hope they will for the future, ſend them within the Time limited; directed for *Tho. Peat*, Schoolmaſter in *Caſtlegate, Nottingham*; and no where elſe (Poſt paid)

Nottingham, 2 July, 1757.

New MATHEMATICAL QUESTIONS propoſed to be anſwered in the next Year's Diary.

(1) Queſt. 174. by Mr. *Sam. Towndrow* of *Cheſterfield*.

Let the Circle inſcribing a regular Heptagon be given, whoſe Diam. is 2, from whence the Side of the Heptagon is required

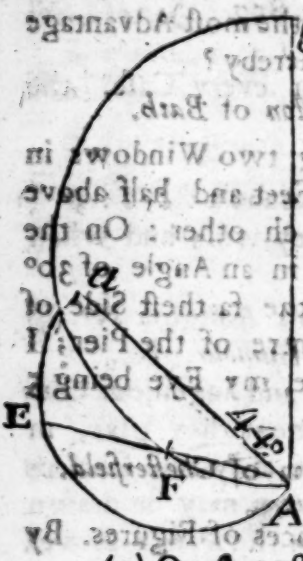
by an Equation not exceeding a *Cubic*, and to deduce the Root of the said cubic Equation, by the Canon of Sines, without destroying the second Term (as the usual Method is) with the Investigation and Operation, true, to nine or ten Decimals at the least.

(2) Quest. 175. by Mr. *Tho. Hare* of *Sheffield*.

Being at a Gentleman's House one Evening, four of us agreed to have a Game at *Whist*; the Deal happened to the Person on my *left Hand*, and the three first Cards he gave me, were *Ace*, *Duce* and *Tray* of *Clubs*, and in that Order: Quere the Number of Tryals he might have undertaken (with Equality of Chance) to give me those Cards, in the Order aforesaid?

(3) Quest. 176. by Mr. *Wm. Bevil* of *Harpswell*.

What will be the Time of the Day, on *May* the 29. 1759. in the Lat. 78° 59′ 22″ N. when the Degrees of the Sun's Azimuth from the South, are to those of his Altitude, as *four* is to *three*?



(4) Quest. 177. by Mr. *Tho. Moss* of *London*.

The Diameters, A *a* and A *b* of the two Semicircles are given = 25 and 40 (equal Parts) respectively, also the Angle (*a* A *b*) formed by those Diameters = 44°. 'Tis proposed to draw a Line from the Point A, so that the Rectangle contained under the two Chords AF, and AE, may be = 190,864; likewise to determine the Length of each Chord, and give the whole *geometrical* CONSTRUCTION.

(5) Quest. 178. by Mr. *Alex. Rowe* of *Penzance*.

In the Winter Quarter, *Anno* 1757. Day broke 20′ past four, and that Morning the Sun rose 16 past nine: I desire to know, *where* and *when* this happened?

(6) Quest. 179. by Mr. *Tim Drury* of *Great Houghton*.

One Day last Spring, having a Journey to perform, my Road lying directly *West*, I observed when I set out, my Shadow at Sun rise, made an Angle with the Road of 24° 60′. after I had gone 20 Miles the same Morning, I observed my Shadow made an Angle with the Road of 70° 12′. when the Sun was 48° 30′ high. From which I would know the Latitude of the

Phee; Time of Observation; and the Rate at which I velled? It being uniform?

(7) Quest. 180. by Mr. *Wm. Reeves* of *Bourton Gl.*

In a right angled Triangle, there are given the *Ratio* of the des as 3 to 4: And the Diff rence between the *Area* of its scribed Circle, and inscribed Square, =20,2825. required the es, and Sides of the Triangle?

(8) Question 181. by Mr. *John Chester.*

A Gentleman offers a Farmer a Lease for 21 Years (to com ence the 1st Day of *January* 1758.) of several Parcels of Land the Manner following (viz.) 24 Acres of Land, for 24*l.* r *Annum*. But, if a Deposit of 100*l.* be immediately paid own, to pay 14*l.* *per Annum*. And 48 Acres for 48*l.* *per nnum*, But if 200*l.* be paid down, then only to pay 28*l.* *per nnum*, and so in Proportion for 120 Acres: Now, supposing e Farmer pays his Rent by half yearly Payments; and allow g him 5*l.* *per Cent.* *per Annum*, compound Interest for the ney paid down; which Offer will be of the most Advantage him in 21 Years; and the Sum saved thereby?

(9) Quest. 182. by Mr. *Wm. Kingston* of *Bath.*

Being in a Room 10 Feet wide, having two Windows in ront, each 3 Feet wide, 6 Feet high, 2 Feet and half above e Ground, and 3 Feet distance from each other: On the utside is a Slope rising from the House, in an Angle of 30° ith the Horizon: Supposing I stand at the farthest Side of e Room, in a direct Line with the Centre of the Pier; I emand what Area I can see of the Slope, my Eye being 5 eet and half from the Ground?

(10) Quest. 183. by Mr. *Sam. Towndrow* of *Chesterfield.*

Let $x^x + a = \frac{a^2}{x^x}$. Quere x true to six Places of Figures. By general Method. Note $a = 1000$.

(11) Quest. 184. by Mr. *Alex. Rowe* of *Penzance.*

Required the Value of x, when $\frac{\overline{x^{\frac{13}{15}}}}{x^{\frac{1}{3}}}$ } of a Pound Str. a *Maximum*; or the greatest Possible

(1) Quest. 185. by the same.

Required the Area, and Construction of the Curve expressed by the Equation $10bae - 5b^2 = 5a^3$; in which $b = 12$ Poles?

Answers

Answers to the Ænigmas in the last Year's Diary.

1. A Thumb.
2. A Beard.
3. Number Three.
4. A Tear.
5. The *Word* No.
6. Ale.
7. Back-Gammon Table.
8. Life.
9. A Walnut.
10. Ignorance.

Mr. *Charles Underwood* of *Bath*, ſolves all the laſt Year's Ænigmas, in a ſerious Reflection on the *paſt*, and *preſent* State of Old England.

Ah! Britons! Britons, *mourn* with Tears,
To ſee your Honour *loſt!*
You once did fill your Foes with Fears,
When o'er the Seas You croſs'd,
No Gold, could *Britain's* once be Tray! 5: 10.†
Nor *Cowards* blaſt our Name:
For *Sea*, or *Land*, We bore the Sway,
And conquer'd where we came:
But, now alaſs; we cannot boaſt
In this our preſent State;
But, let's renew the ancient *Toaſt* *
And Love; but never Hate.
With one Conſent, join Hand ‡ and *Heart!*
Our *Nation* to Defend,
And Strife for ever hence depart,
That *Wars* may Glorious End!
So ſhall each Man enjoy his Glass 6. of All.
In Peace *(under his Vine)*
Tho' Grey with *Age*, his Life may paſs †, 8. 2.
With Pleaſures near Divine.
From *Year* to *Year*, he may behold
The Trees their Produce bring; 9. Walnut Tree.
And, when his Game is almoſt told,
He chearfully can ſing;
Long may the *Britiſh* Monarch Reign,
In Peace, and Length of Days;
And, after Death *his* Name remain,
In Honour, Fame, and Praiſe!

* Succeſs to old *England*. † Alluding to the Thumb. ‡ Alluding to the Beard.

Mrs.

Meſſ. *G. Clarke Butler, William Ingram, John Palmer, William Smith, William Smith, Iſaac Tarrat*, and others, ſent us Poetical Solutions to the Ænigmas, which we cannot inſert for want of Room, &c.

NEW ÆNIGMAS to be anſwered next Year.

(1) Ænigma 125, by Mr. *James Hall.*

Terra rudem peperit, ſed homo formavit in uſum;
Hic mihi patris erat, matris at illa loco.
Dein exornavit gemmis faber arte magiſtrâ,
Verbaque permiſit pauca ſed apta loqui.
Do formam, do et opes; quis non amplectitur? ecce,
Me Venus, & Nymphæ, ac ipſe Cupido favet.
Et juveni gratus venio, placitusque puellæ;
Meque repubeſcens conſcia quærit anus:
Me vidua exoptat Thalamos jam experta priores,
Captat et audaci facta proterva manu.
Fidus honeſtati ſervus quoque templa frequento,
Inde ſacerdoti commoda magna fero:
Annuit ille mihi, riſuque: agnoſcit amicum,
Conjugis atque ſtolas muneris eſſe mihi.
Hic ruit in laqueum captus dulcedine prædæ;
Sero ſed aurati ſentit amara doli.
Væ miſero! fruſtrà ſunt omnia, vincula, claves,
Flagra, minæ — nihil eſt; cornua fronte gerit.
'O torus! O conjux! et tu digitale cariſtrum!
'Mille mali ſpecies! verba timenda ſono!
Nec mihi culpandum eſt; alibi Theodorus amatæ
Aviſiæ redolet ſuavia caſta ſuæ;
Atque meis fælix opibus ſylvanus amore,
Gaudia legitimi carpit honeſta tori.

(2) Ænigma 126, by Mr. *W. Swift*, of *Stow.*

Like *Adder*, or *Snake*, my ſlender Body moves,
And winding ſtill on different Bodies roves,
In narrow Bounds, I hold half human kind,
Impriſon Queens, yet ne'er was *tho't* unkind.
In Holes I ſneak, when Phæbus ipreads his Light;
But leave them when his Abſence brings on Night.

(3) Ænigma 127, by Mr. *John Webſter*, of *Ringley*, in *Lancaſhire.*

My Head and Tail both equal are,
My Middle's ſlender as a *Bee*;
Whether I ſtand on Head or Heel,
'Tis all the ſame to you or me.

But, if my Head ſhould be cut off
The Matter's true; altho' 'tis ſtrange:
My Head and Body ſever'd thus,
Immediately to Nothing change!

(4) Ænigma

(4) Ænigma 128, by Mr. *William Ingram*, of *Corf Caſtle*.

From the Woods and the Earth, I acknowledge my Birth,
Of my Shape I'm not going to brag;
For a Head I do lack, yet have Belly and Back,
But never an Arm, or a Leg.
I've a Body ſo thin, that there's no Guts within,
Such awkward ſtrange Figure I ſhew,
My Teeth let me tell ye, are plac'd on my Belly,
On which I do often times go.
But, I then have a Friend, that does help to the End,
And if I in Battle am found;
Stands by me ſo ſure, that I never give o'er
Till my Oppoſite falls to the Ground.
Nay, I oftentimes kill; tho' Blood ſeldom ſpill,
To conquer I never make Doubt;
For, when put in a Rage, do refuſe to engage,
With my Match, or ten Times as ſtout.
But to leave this Proceeding, and now for my Breeding
Know ye, that I'm not without Learning,
Tho' I don't underſtand, for to write a fair Hand;
In Numbers you'll own me diſcerning.
I can quickly *divide*; *multiply* too beſide,
You'd think me an Arithmetician:
From theſe Hints I don't doubt, but you'll ſoon find me out
And publiſh my Name and Condition.

(5) Ænigma 129, by Mr. *Thomas Hare*, of *Sheffield*, *Yorkſh.*

Whilſt Mortals ſtrive, ambitious of a Name,
And ſtudy various Ways to purchaſe Fame;
Oft pueril Thoughts, with florid Phraſe conjoin'd,
Betray the Meanneſs of the groveling Mind.
But, Souls, with Sapience and with Science fraught,
Ideas bright, and comprehenſive Thought,
Who Truth's fair Goddeſs to dull Sloth prefer,
Thoſe Honours claim, which ſmiling I prefer!
To trace my *Origin* ſhou'd you preſume,
Survey old *Greece*, reflect on Pagan *Rome*;
There, I in priſtine Pomp and flow'ry Pride,
Celeſtials honour'd, Heroes dignify'd!
Beſtow'd on Statues, upon Shrines was hung,
Whilſt *Madrigals* in merry Madneſs ſung:
The Godhead pleas'd.—And Britiſh *Nymphs* ſtill pay,
The ſhort-liv'd Honours of a Summers Day.

What, tho' ſome Saints the Honours I beſtow'd,
efus'd, nor, of my Uſe divine, allow'd;
n Temples ſtill my meagre Shape is ſeen,
ut far unlike my Fragrance on the Green:
Thus, incoherent, yet, conſiſtent End,
dorn the Gay, and funeral Rites attend.

(6) Ænigma 130, by *Tabularius*.

e Learned in *Sciences* profound,
Who can deep Myſteries expound:
rom *Parallellograms* and *Squares*,
an tell when *Mars* and *Venus* pairs;
nd when the Reſt of the *Deities*
Take friendly Viſits in the Skies:
When *Luna* ſteals in Part away
rom *Sol* his lamp that lights the day,
Leaving this nether World in pain)
nd when ſhe will reſtore again.
ttend, and ſummon all your Senſes;
bring you ſage Intelligences,
of Secrets rare, unknown to Quacks
Who write *predicting* Almanacks;
What ne'r their crony *Stars* cou'd tell
To *Partridge*, *Moor*, or *Sidrophel!*
Like ſubtle *Conjurers* of State,
Who Peace or War *prognoſticate*;
foretell many a bloody Battle,
nd, when ſly knaves *filch* poor men's
Cattle,
Or rings or watches hap to ſtray,
At Opera, Maſquerade, or Play;
I tell the Time, and Place, and when,
And where, they may be found
again.
I can much greater Things atchieve,
And, what you ſcarcely will believe:
The Clergy, I direct to th' Spot,
Where *good fat* Livings may be got:
I *tell* where *Rhino*, Houſe, and Land
Are to be had, at your Command;
And, what will cure all human
Ills,
(If you'll believe the *Doctor's* Bills;
Poſt haſte from Town to Town I go,
And all pro bono publico.
Ingenious *Philomath's* reveal
What, I've endeavour'd to conceal:
Examine well this learned Diary,
It ſoon will anſwer your Enquiry.

(7) Ænigma 131, by Mr. *John Dyke*, of *Manningford*.

carce twenty Years in Britain's Iſle,
Have I Exiſtence found,
ltho' dark Myſteries I reveal,
And Sciences profound.
puzzle Men of ev'ry Rank,
To cultivate their Brain;
Which, to ſome Perſons gives De-
To others I bring Gain: [light
For Uſe to all, I am eſteem'd;
And Poets without Doubt,
Aſſiſt, (ſuch as are Poets deem'd)
And, *they* muſt find me out.

(8) Ænigma 132, by Mr. *Charles Underwood* of *Bath*.

ttend ye artful Nymphs and Swains
While I my Fate reveal: [*Pains*
ow many Hearts I've fill'd with
y more than *Love* can heal.
with young Ladies *rank* in Name,
(Tho' hated by them all:)
ecauſe I bring them oft to Shame;
Too late for to recall.
ut, if my Name they do *divide*,
And take the latter *Part*;
greatly puff them up with Pride,
And win the Lover's Heart.
But, ah! poor *England* feels my weight
Since it's engag'd in War:
Tho' noble *Blakeney* did his Parts
Not fearing *Death* nor *Scarr!*
Millions of Hearts I've made to *bleed*,
Yet I no Mercy ſhew:
Tho' I from Fortune's Race proceed
And *daily* am with you:
The greateſt Monarchs are on Earth
My Subjects, to a Man:
Now tell my name and trace my birth
Avoid me, *if you can!*

(9) Ænigma

(9) Ænigma 133, by *Mr. John Palmer, Schoolmaster at Wrotham in Kent.*

Diſcerning Bards, wrapt in immortal Fame,
Undraw the Curtain, tell me what I am:
By tyrant Hands I gain'd *unwilling* Birth,
Torn from the Bowels of my Mother Earth!
My Form, then rude, am deſtined to feel
The keeneſt Blows, from unrelenting Steel!
Geometric Form to gain, all this I bear,
And then a well known Figure I appear,
My *Harneſs* near of Kin, as ſome ſet forth,
Becauſe one Parent gave us both our Birth;
What Tortures *it* endur'd is hard to tell,
Nay *Damiens'* trifling to what *it* muſt feel
Before compleated: then our *place* we take
And find Employment *chiefly* with the *Great*.
With *Peers*, with *Knights*, with *Squires*, or ſuch Degree,
(But with *poor* Peaſant ſeldom deign to be.)
Midſt aromatic Banks my Progreſs make,
Yet, from their Fragrance, can no Pleaſure take,
For, I a Drudge, and perfect Slave muſt be,
Driven by Force, ſuch my hard Deſtiny!
Yet, on the verdant Greens, where *Beaus* do play
And *Nymphs* in ſportive Pleaſure paſs the Day
My preſſing Movements often I diſplay.
So obvious is my Tale, the Hints ſo plain,
That ſolving me, can never *crack* your Brain.

(10) 134, an Ænigma in *Proſe*, by *Aiſhmella*.

Gentlemen, &c.

I am come to tell you in plain *Proſe*, that I am a very great *Poet*: Dactyls and Spondees are familiar to me. Many of the moſt elegant Productions of the Age are indebted to me for no ſmall Share of their Merit, I ſmooth their rugged Numbers, and ſupply their Vacancies of Wit.

Sometimes I'm a *Fidler*—and conſequently, ſomebody of Note. I open the Balls at Court, and lead up the ragged Regiment of *St. Giles's*. Your *Giardini's*, and your *Geminiani's* without me are leſs ſignificant than the poor blind Scraper at *Bedlam*. I preſide over your Concerts, and alway make *one* with the *four and twenty*.

In Phyſic more renowned than the High German Doctor. Let ſtupid Drones ſtudy—I practice. Without a Word of *Hyppocrates*; I have done Wonders—where the whole ſtiff-rump'd

mp'd Faculty have failed. It ſtands on Record that I have ed the Fever; and for a certain Diſtemper that ſhall be meleſs, am a moſt amazing Specific.

As a Dancing Maſter, I as much excel the red-heeled *Petits aitres* of the Age, as roaſt Beef and Plumb Pudding are be- nd *ſoupe maigre les Granovilles fricaſſee's*. Avaunt, ye Mi- it-mongers! No more of your *Coupees* and your *Baltances!* each without the Clog of Rules, and my Pupils learn by- ſtinct. I have taken an awkward Bumpkin, without a Grain Mercury in him, and led him like a tame Bear through all e Modes and Attitudes of dancing; thus realizing the Poet's ction and making Beaſts dance after me.

Nor do I want Activity myſelf as a Dancer: I have hopp'd u many a *Hornpipe* and *Rigadoon* upon the tight Rope.

I ſerved my Time with a *Sawyer*, and there I learnt — *See, w.* My Maſter was deſperately enamoured of Miſs K—h- *ipes*, and uſed me as Spokeſman. I managed Matters ſo well h her, that many's the good Time, and often I have made Slut's Guts wamble again. Offering once to ſalute her h greaſy Lips, the Nymph was ſtruck ſpeechleſs at the Af- nt; and my Maſter in a pet diſcarded poor *Pill-Garlic*.

(11) Ænigma 135, by *Jacobum Whitley, Hiſtrionem.*

o' more than twenty Eyes, I have indeed I cannot ſee;
t many more my Favour crave, than Health or Liberty.
arry my Commiſſion where I deign to make a Shew,
o' ſpotted as the Leopard's Hair, my Skin's as white as Snow.
rs'd by the Cully oft I am, tho' courted by the great;
t innocent as any Lamb, ſuch my ſiniſter State!
more careſs'd when at the Play I grace the gorgeous Box,
ſit ſerene the total Day, as Wolf or wily Fox.
give deſpairing Souls Content, or make a mighty Pother,
e Wit of Man could ne'er invent two Things like me and Brother.

An *Alphabetical Catalogue* of Contributors to this Diary.

Fig. 1, 2, 3, &c, ſhewiug the Queſtions, the Numerical Letters i, ii, iii, &c. the Ænigmas each anſwered, &c.

Iſhmella, prop. 1 Ænig. Mr. Tho. Allen 10, 12 all Æ. but x. Calc.) Ecl. Mr. Will. Beech. *Tiddeſwel* Fairs. Mr. Will. Bevil Q. an a Par. Mr. G. Clarke Butler, anſwered the Ænigmas in e, prop. a Reb. & a Par. Mr. Steph. Brackſtone prop. 1 Æn. Mr. Cheſter i. ii. iii. vi. vii. ix. propoſed i. Careleſs Jack, all but iii & x. Calc.

Calc. ☽ Ecl. Mr. John Dyke i. ii. iv. v. vi. vii. viii. prop. i. and 2 Q. buſes, Mr. Tim. Drury, 2, 3, 4, 8. i. ii. iv. v. vi. viii ix. prop. 1 Q. 1 Ænig. Mr. Luke Elſtob. jun. i. ii. iii. iv vi. vii. viii. prop. i. Calc. Ecl. F. J. Mingle all but x prop. i. Old G---d---n. nothing at all, Joſh. Holroyd 2, 3, 8, 12, all but iii & x. Mr. Thomas Hare 3, 8, iii, iv, v, vi, vii, viii. prop. i. Æ and 1 Q. Mr. John Hall all Æ and Qu. Mr. Matthew Johnſon, every Thing. Mr. Will. Ingram ſome Æ Verſe. prop. 1. Mr. William Kingſtone all Æ and all Qu. prop. 1 Æ. Qu. Mr. Chr. Maſon all Ænig. & prop. 2. Mr. Robert Marſh all but and x. prop. i. J. M. *Northampton*, ſome in Verſe. Mr. Thomas Mo Qu. and propoſed *one*, Mr. J. Randles pr. 1 Æn. * Mr. John Palmer in Verſe, Mr. Alex. Rowe prop. 4. Qu. Mr. William Reeves prop Qu. Mr. Jeremiah Roe, *Derby* Fairs. Mr. Mich. Rowland all in Verſe. William Smith all in Verſe, prop. 2, Mr. William Smith all Q but Some in Verſe. Mr. John Thorpe Calc all the Ecl Mr. Samuel Tow drow 8 prop. 2 Calc. all Ecl. Tabularius 9. 13. prop. i Æ. Mr. Tarrat, all in Verſe, prop. 1. Mr. Charles Underwood all in Verſe, 1. Mr. John Webſter all but ix, x. prop. 1. Mr. Robert Waddington Calc. all Ecl. Mr. Jacobum Whitley, *Hiſtrionem* prop. 1 Ænig.

FINIS.